PACKAGE engineering

In this issue –
Program of the AMA National Packaging Conference (Page 65) and booth-by-booth review of the National Packaging Exposition (Page 83)

Don't let automatic cartoning confuse you

Taking a close look at cartoning principles and limitations gives you a basis for setting up requirements, standards, and machine selection, in terms of specific, particular needs for your operation. (See Page 39)

Cost cutting demands a balancing act

Squeezing all excess cost from a package means weighing every element of materials, specifications, equipment, methods and capitalizing on scientific practices such as methods time measurement and standard time values. (See Page 46)

Keeping up with thermoplastic closures

Development of threaded closures of polystyrene rests on knowing the material's functional properties and performance characteristics — and understanding how injection molding influences closure design. (See Page 58)

Complete table of contents on Page 2

MARCH 1960
VOLUME 5 • NUMBER 3

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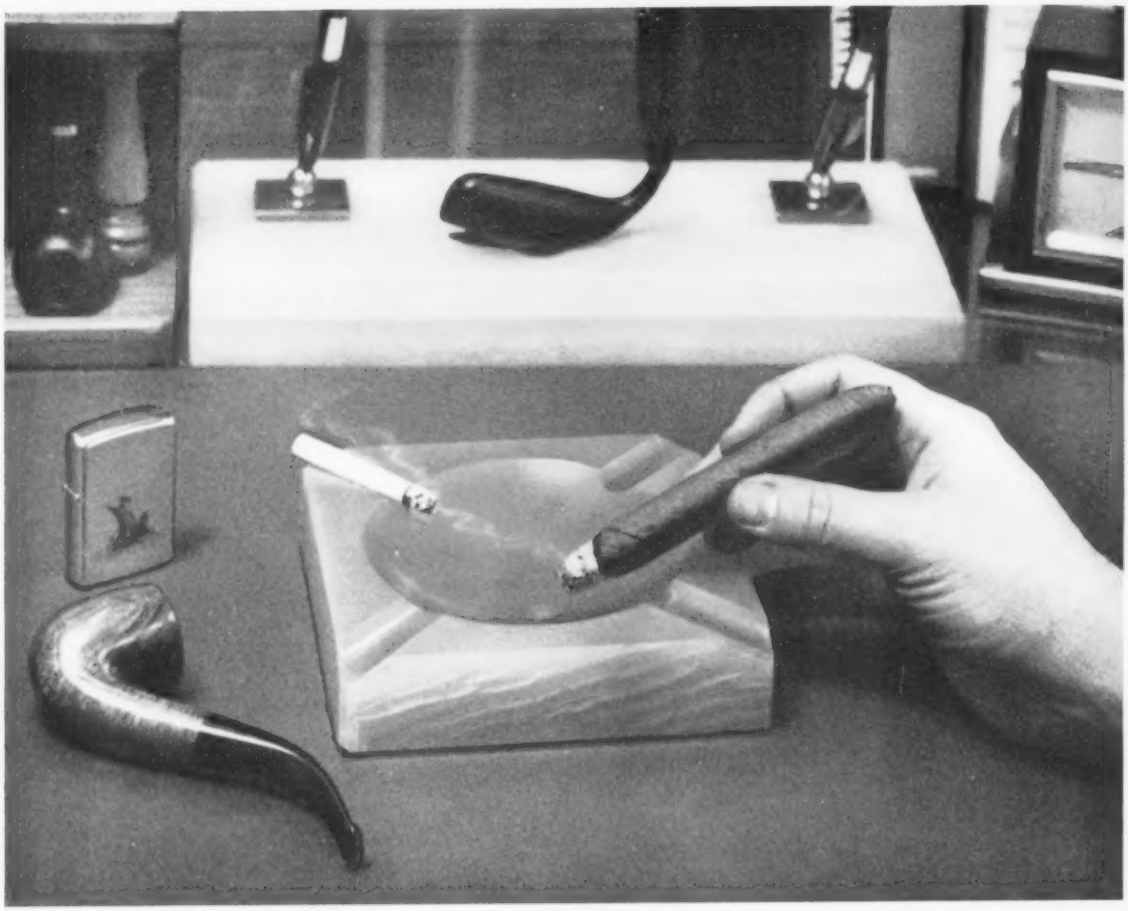

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For more information circle No. 201 on Reader Service Card, Page 117

Aluminum Foil Packaging— Advantages of High Thermal Conductivity

One of a Series of Reports by Reynolds Metals Company

Thermal conductivity is a property often overlooked or considered of little consequence in the selection of packaging materials. Growth of the frozen and refrigerated foods industry, however, is placing increased emphasis upon the thermal properties of the package. Frozen foods producers are interested in faster and more efficient freezing. Grocers are interested in obtaining maximum efficiency from storage cabinets—which are frequently overworked. And, of course, the ultimate consumer is interested in rapid thawing or heating. The high efficiency of aluminum foil as a conductor of heat makes it unique among flexible packaging materials.

Both freezing and thawing can be speeded by aluminum foil's high thermal conductivity—by faster removal of heat from the package in air blast, plate or immersion freezing, and by faster transfer of applied heat into the package in thawing. On the other hand, where heat is conveyed by radiation rather than by contact, the high radiant heat reflectivity of aluminum foil will retard thawing rates.

Still other benefits are to be gained in storage situations where it is important to minimize temperature fluctuations. As an illustration, the accompanying graph shows the temperatures of ice cream in pint packages of waxed fiberboard cartons with and without aluminum foil overwraps.

©1960 by Reynolds Metals Company

These packages were stored in an open top refrigerated display cabinet typical of those generally found in self-service markets.

It is a well documented fact that ice cream deteriorates rapidly through softening, shrinking and coarsening of texture if the temperature rises even a few degrees above its proper storage temperature. The most severe test of the packaging material, naturally, takes place in the top layer of the storage cabinet since exposure to radiant heat and convection currents is greatest at that point. Practical experience shows that ice cream in this location does, in fact, deteriorate most rapidly.

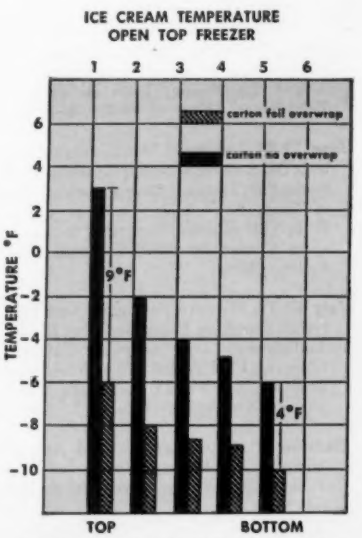
Test results shown in the graph indicate that, in this most exposed layer, the ice cream in foil wrapped cartons was held at 9°F *lower* temperature than ice cream in plain cartons on the same layer.

Even in the bottom layer, where radiation and convection are minimized, the temperature of foil wrapped ice cream was maintained at 4°F colder than ice cream in plain cartons.

Two properties of the aluminum foil wraps were responsible for maintaining these important lower temperatures. First, the great reflectivity of aluminum foil reduced the temperature rise due to radiant heat. Second, the high thermal conductivity of the aluminum permitted the gained heat to be conducted downward to the colder areas of the cabinet where it was effectively removed by the refrigeration equipment.

The absolute temperature values are not the significant point. What is significant is that the ice cream in plain cartons on the upper levels deteriorated while the foil wrapped ice cream on the same levels did not because lower temperatures were maintained.

Your local Reynolds representative will be glad to show you how aluminum foil packaging can best meet your individual problem. Or you may write direct to **Reynolds Metals Company,** General Sales Office, Richmond 18, Va.



See these Reynolds shows on ABC-TV Network: "BOURBON STREET BEAT" and James Michener's "ADVENTURES IN PARADISE" Monday Nights, "ALL STAR GOLF" Saturdays.

MARCH 1960 • VOLUME 5 • NUMBER 3

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

For your calendar

March 18, 19. The Refrigeration Research Foundation symposium on package environment in refrigerated warehouses, LaSalle Hotel, Chicago, Ill. Contact: Dr. Walter A. MacLinn, director and secretary, The Refrigeration Research Foundation, 12 N. Meade Ave., Colorado Springs, Colo. *Telephone: MElrose 3-2801.*

March 23-25. AMA workshop seminar on packaging machinery — when and how to buy capital equipment, LaSalle Hotel, Chicago. Contact: John L. Wood, packaging director, American Management Association, 1515 Broadway, New York 36, N. Y. *Telephone: JUdson 6-8100.*

April 4-6. AMA National Packaging Conference, Shelburne Hotel, Atlantic City, N. J. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N. Y. *Telephone: JUdson 6-8100.*

April 4-7. 29th AMA National Packaging Show, Convention Hall, Atlantic City, N. J. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N. Y. *Telephone: JUdson 6-8100.*

April 19-21. Annual meeting of the Research and Development Associates, Food and Container Institute, Inc., Congress Hotel, Chicago, Ill. Contact: Col. R. A. Isker, secretary, Research and Development Associates, 1819 W. Pershing Road, Chicago 9, Ill. *Telephone: LAfayette 3-5500.*

April 19-23. Interpack and EPF Congress in Dusseldorf, Germany. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

June 12-25. Industrial Management Center's 7th Annual Material Handling and Packaging Training Course, Lake Placid Club, New York. Contact: James R. Bright, director, Industrial Management Center, 56 Robbins Road, Lexington, Mass.

July 19-21. Western Packaging and Materials Handling Exposition, Pan Pacific Auditorium, Los Angeles. Contact: Clapp and Poliak, Inc., 759 Monadnock Building, San Francisco 5, Calif. *Telephone: DOuglas 2-7876.*

October 31-November 2. 22nd Annual National Packaging Forum of the Packaging Institute, Statler-Hilton Hotel, New York, N. Y. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N. Y. *Telephone: MUrray Hill 7-8875.*

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58 Match polystyrene properties/threaded closure performance needs, by J. W. Mighton and R. E. Pfister, molding section, plastics technical service, The Dow Chemical Company
Stressing the importance of selecting right material for a given closure application, and providing basic physical design considerations for threaded closures.

62 Injection molding process, by J. W. Mighton and R. E. Pfister, molding section, plastics technical service, The Dow Chemical Company
Discussing machine operation and mold design pertinent to a better understanding of the authors' article on matching material properties with closure performance.

70 Let's analyze drop tests for multiwall bags, by John O. Younger, container technologist, Quartermaster Food and Container Institute
Critical analysis of three test methods to determine how valid and effective they are, with reactions of each toward the test bag; and relationship among tests.

78 Package development pays off! by Bernard F. Major, manager, packaging laboratory and receiving and stores division, Ortho Pharmaceutical Corporation
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Our December, 1960 issue will carry a cumulative editorial index for the year, listing our feature articles by subject, author, and other headings.

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Package Engineering is published monthly by Angus J. Ray Publishing Co. 185 North Wabash Avenue, Chicago 1, Illinois. Angus J. Ray, president; R. B. Holmgren and I. F. Megargee, vice presidents; James G. Culbertson, secretary; and Ethyl K. Ray, treasurer. Please address articles for publication and correspondence regarding the editorial content to the editor. Statements and opinions expressed in articles and editorials are those of the respective authors, for which Package Engineering assumes no responsibility. Copyright 1960 by Angus J. Ray Publishing Co. The name Package Engineering is registered in the U. S. Patent Office.

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A note from the Publisher

The National Packaging Exposition

We call your attention to the size of this issue of PACKAGE ENGINEERING because it is one of the largest we have published. Undoubtedly the reason for this is two-fold. First, it is a reflection of the steady growth of PACKAGE ENGINEERING. Our advertising volume for 1959 topped 1958 by 26 per cent and this trend continues into 1960. Second, the AMA National Packaging Exposition which will be held in Atlantic City April 4th to 7th, is being previewed in this issue. The National Packaging Exposition, incidentally, is the only packaging show being held east of the Rockies this year — however, a western packaging show is scheduled for Los Angeles in July.

Regardless of whether you attend the National Packaging Exposition or not, you should be interested in the editorial content we have devoted to it. If you *are* going, you will be interested in learning what is being exhibited beforehand. Obviously, with some 335 exhibitors, it will be difficult, if not impossible, to explore very thoroughly each exhibit and what it has to offer. Therefore, a little planning now will make your visit more pleasant and vastly more profitable.

On page 83, our show section begins. It contains a preview of what each exhibitor is showing and, in many cases, photographs of what is being shown. A little time spent on this section now can save you countless hours later on. Why not check through this section and make a list of booth numbers and exhibits that you especially want to see? You can find additional information about the leading exhibitors by checking the advertising in this issue, as well as in the April issue. Then, when you get to the show, see these exhibitors first.

After seeing the exhibits that pertain to your immediate and known needs, by all means tour the whole show. There will be new ideas and new ways of improving your packaging, that make this extremely worthwhile.

If you will not be going to Atlantic City, enjoy our coverage in our special show section and in our advertising pages. Each month the advertising pages of PACKAGE ENGINEERING actually make up a packaging show in themselves — a show that is devoted to packages, packaging material, and the machinery on which they run. Suppliers to the packaging field spend a tremendous amount of time and effort in preparing ads so that they are informative and worthwhile. If you wish to be aware of everything that is going on in the packaging field, the ads, like the editorial, are required reading each month.

Angus J. Ray

Publisher

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ease of machining . . . short breaking characteristics, to give clean machining without stringing . . . the ability to roll out to thin, continuous film—for strength and economy . . . quick tack to operate with today's continuous motion machines . . . stability over a wide range of temperatures and physical conditions.

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Economic to handle Machinery Service Products

EFFECTIVE FEB. 1, 1960, Economic Machinery Company of Worcester, Mass., will become the exclusive sales and service agent for all Machinery Service Company products throughout the world with the exception of Canada.

Machinery Service, which is located in Louisville, Ky., manufactures feeders, feeder-cleaners, feeder-fillers, fillers and conveyors for glass and tin containers with the exception of those used for beer and soft drinks.

We, of Machinery Service Company, are highly pleased with this new association as it will make available to us the expert knowledge of the sales and service organization of Economic Machinery Company.

All of this firm's sales personnel are graduate engineers and they will provide our present and new customers with the fine type of representation that we feel our products deserve. In addition, the expert service organization of Economic, which has long been recognized as one of the finest in the trade, assures users of Machinery Service products of excellent maintenance work.

Up to now, Machinery Service products have been sold by manufacturers' agents whose loyalties and sales efforts have had to be divided among the varied line of products they handle. We are most grateful for the efforts these men have put forth in our behalf. They have achieved fine results for us in the past, and we realize that they deserve much of the credit for the excellent trade acceptance our products have received.

A careful study of today's highly competitive market, however, has convinced us that if we are to continue to be successful and grow, we must have the full and undivided loyalty of the men who represent us in sales and service. We feel that we will have this from the Economic organization, and that is the reason we are making the change.

We, of Economic, are also highly pleased with this new association. It will provide us with equipment that is closely related to our own product line. Of equal importance, it will give us a line of machines of which we can be proud because of their fine quality.

Machinery Service Company was formed in 1942, but Mr. George A. Craig, president of the firm, has been an outstanding figure in packaging since 1924. He, more than any other single individual, is responsible for the development of the feeder machines and also of the feeder cleaners which have done so much to make high speed automation possible in the packaging field.

This new association represents a challenge to the entire Economic Machinery sales and service organization that we accept.

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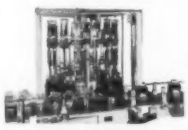

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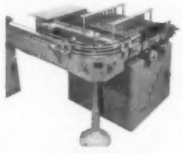

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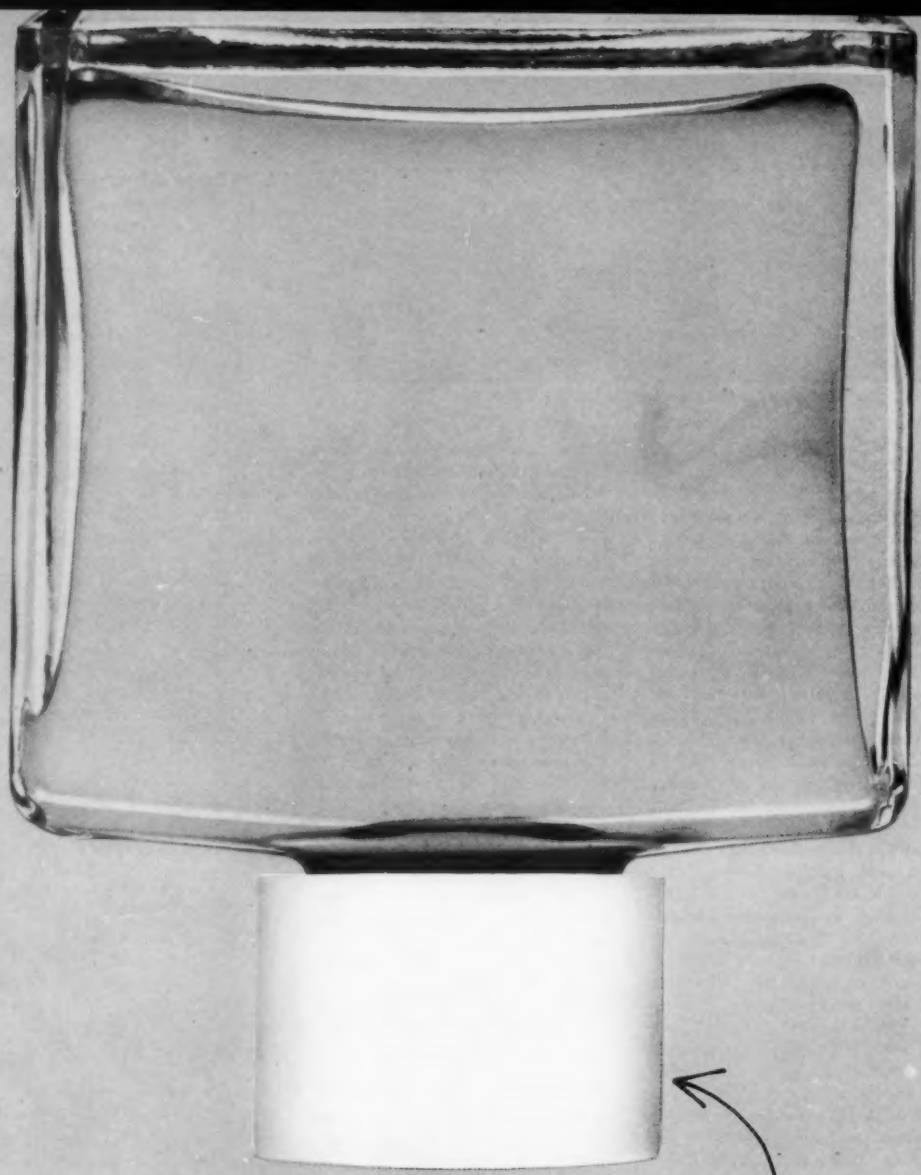

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The PULSE / of Packaging

Trends to watch:

Users and suppliers alike are intensifying their efforts toward developing a single-wall carton, (providing all protective properties without need of inner pouch or outer wrap) and we may have a significant breakthrough on this during 1960, according to reports. . . . Meanwhile, producers of aluminum cans look forward to widespread use of their containers — especially by the food and concentrated juice industry, we hear. **Kaiser Aluminum** says 1960 will see a three-fold increase in aluminum used for cans. **Aluminum Company of America** predicts all citrus products in aluminum cans within five years. . . . But **Continental Can Co.** thinks that plastic bottles, soft drink cans, aerosol containers, and non-returnable bottles for beer and beverages represent the packaging likely to grow most rapidly in 1960.

American Viscose Corp. predicts about 20 million lb. of cellophane as an additional industry gain for this year, noting that the continued growth of self-service retailing is a primary factor assuring this increase. During the past year, multipacking and bundling contributed most heavily to cellophane sales, Avisco adds. . . . Polyethylene producers hope to find new markets for film in bakery products, produce packaging, and the packaging of paper items.

Notes from the government:

The **Department of Defense,** now has a plastics technical evaluation center at **Picatinny Arsenal,** Dover, N. J. It will cover four technological areas: structural, electrical and electronic, packaging, and mechanical uses of plastics. To be known as "PLASTEC", this center will make information available to the public through the **Office of Technical Services, Department of Commerce,** Washington 25, D. C. . . . **Food and Drug Administration** has granted its first time-extension (for compliance with the Food Additive Amendment of one year for study and development of specifications for carbon black and charcoal as coloring materials in food). **National Confectioners Association** had petitioned FDA for this extension.

The containers and packaging division of the **Business and Defense Services Administration** of the **Department of Commerce** warns packagers to be sure they are informed of the new Defense Materials System (DMS) Regulation I. Among other points, it requires all contractors and suppliers for production, construction, and research and development for defense, atomic energy, and space programs to identify all defense purchase orders with the appropriate program symbols and ratings. Copies of the new regulation are available from **Department of Commerce** field offices or from **Business and Defense Services Administration, Department of Commerce,** Washington 25, D. C.

Groups in the news:

The **Society of Packaging and Handling Engineers** will accept entries for its 1960 competition until May 8. This national competition featuring eight categories of packaging is being handled by the society's southern California chapter. Address of competition chairman is P.O. Box 22082, Los Angeles 22, Calif.

Packaging across the seas:

Interpack 1960 is going to have an exhibit on "seaworthy packaging" which will feature good and bad methods of transport packaging. . . . **The Dow Chemical Co.'s** wholly-owned Dutch subsidiary, **Nederlandsche Dow Maatschappij N. V.,** plans to build a styrene-butadiene latex plant in Rotterdam, expects to supply latex to manufacturers of industrial paints and packaging materials in Western Europe . . . . **Elgin Manufacturing Co.** showed its automatic single valve filler at the First World's International Agricultural Fair, New Delhi, India. . . . **Owens-Illinois Glass Co.** has purchased substantially all of the stock of **Compagnie Internationale de Gobeleterie Inebrechable S. A.,** of Soignies, Belgium, expects to expand its sales with the realization of the European Common Market.

More expansion for packaging:

Hercules Powder Co. plans to acquire **Imperial Color Chemical & Paper Corp.** . . . Plans for a 185,000-sq.-ft. plant near Forest Park, Ga. to manufacture glass containers were announced by **Knox Glass, Inc.,** Knox, Pa. . . . **Federal Paper Board Co., Inc.** and **Manchester Board and Paper Co., Inc.** stockholders will vote soon on a proposed merger. . . . A merger agreement for **Standard Packaging Corp.** and **Brown & Bigelow** has been formulated.

Normandie Cups, Alexandria, Va., has been acquired by **Standard Packaging Corp.** . . . **Bivans Conveyor Co.,** Los Angeles, is announced as a new firm affiliated with **Bivans Corp.** . . . In Lancaster, Pa., **Packaging Corp. of America** opened an 82,000-sq.-ft. corrugated shipping container plant costing $2.5 million.

To increase floor space by 20 per cent, **George D. Ellis & Sons, Inc.** will construct addition to its Philadelphia plant. . . . **Mead Corp.** tells of start-up of 38th plant, its first manufacturing operation on the West Coast. . . . Through merger with **Continental Can, Gair Woodlands Corp.** and **Southern Paperboard Corp.** will be known as **Continental Woodlands Division of Continental Can Co.** and **Continental Can Co.** Plant 540 respectively. . . . **National Cleveland Corp.** has established a new plastics chemical division in Bridgeport, Conn.

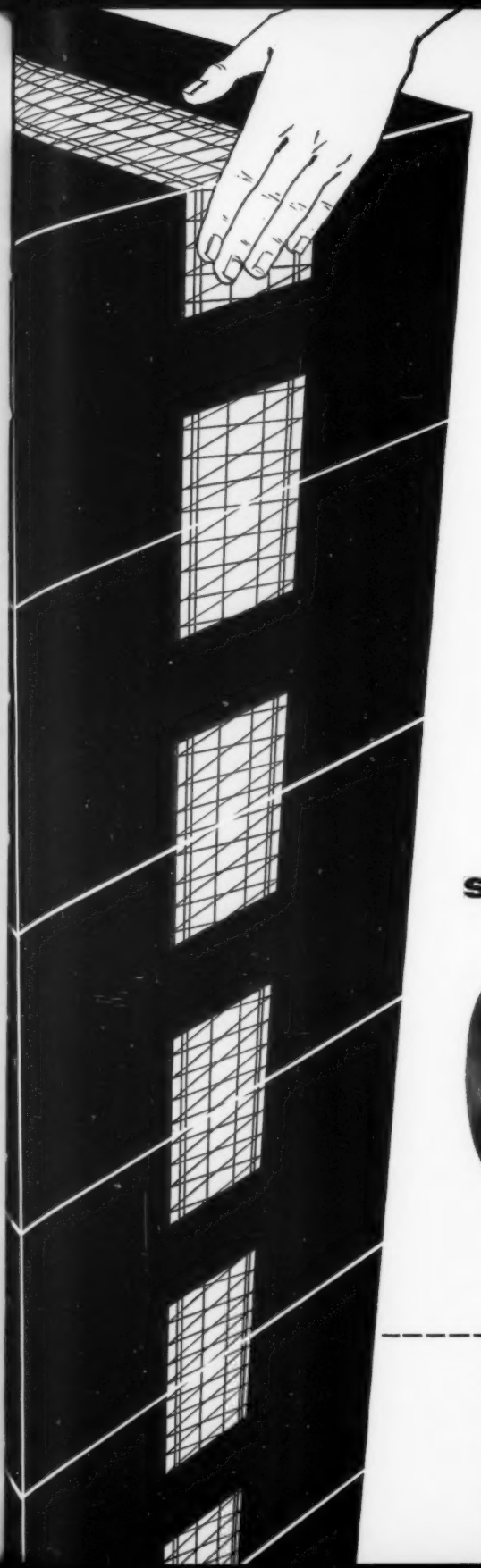
Expansion of the polyethylene capacity of Freeport, Texas division of **The Dow Chemical Co.** is told. . . . **R. C. Can Co.,** manufacturer of fibre cans and spools, has opened a new division plant in Chicago. . . . A 50,000-sq.-ft. packaging machinery plant is being constructed for **Cryovac** equipment division of **W. R. Grace & Co.**

We hear that **St. Regis Paper** plans to acquire **American Sisalkraft Corp.** through an exchange of shares. . . . **Eureka Specialty Printing Co.,** Scranton, bought **Pee Cee Tape and Label Co.,** Los Angeles, which was formerly known as **Printed Cellophane Tape Co.** . . . **Rossotti Lithograph Corp.,** makers of multicolor packaging, tells of purchasing world's largest sheet-fed offset press.

In Springdale, Conn., **Polymer Industries, Inc.** completed construction of a new half million dollar facility for production and laboratories. . . . **Thiele Packaging Machinery Co.** became a new division of **Stainless & Steel Products Co.** . . . **Milprint, Inc.** will consolidate its operations and center production in expanded plants in Downington, Pa. and San Francisco, Calif. . . . **Continental Can's** corrugated box plant in Tyler, Texas has increased in size by 83,000 sq. ft.

What people are doing:

Atlas Vac-Machine Corp. has named **Richard D. Cole** production manager. . . . Now in charge of Extrudo-Film Corp.'s new field research division is **I. E. Becker,** technical service manager; **Alfred Slatin** is Eastern sales manager and **George A. Stryker** is Southeastern representative of Extrudo-Film. . . . Rexall Drug and Chemical Co. has named



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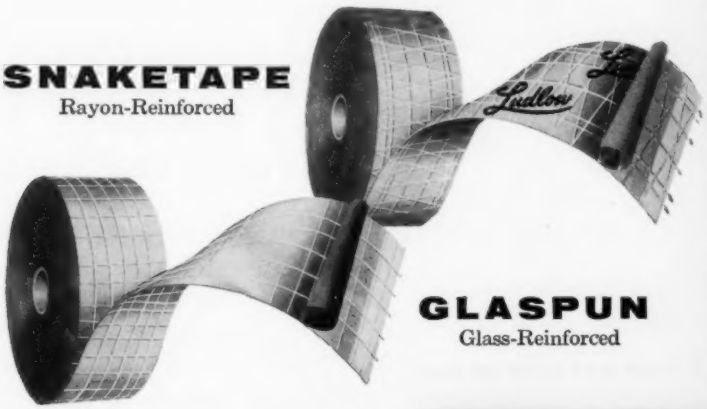

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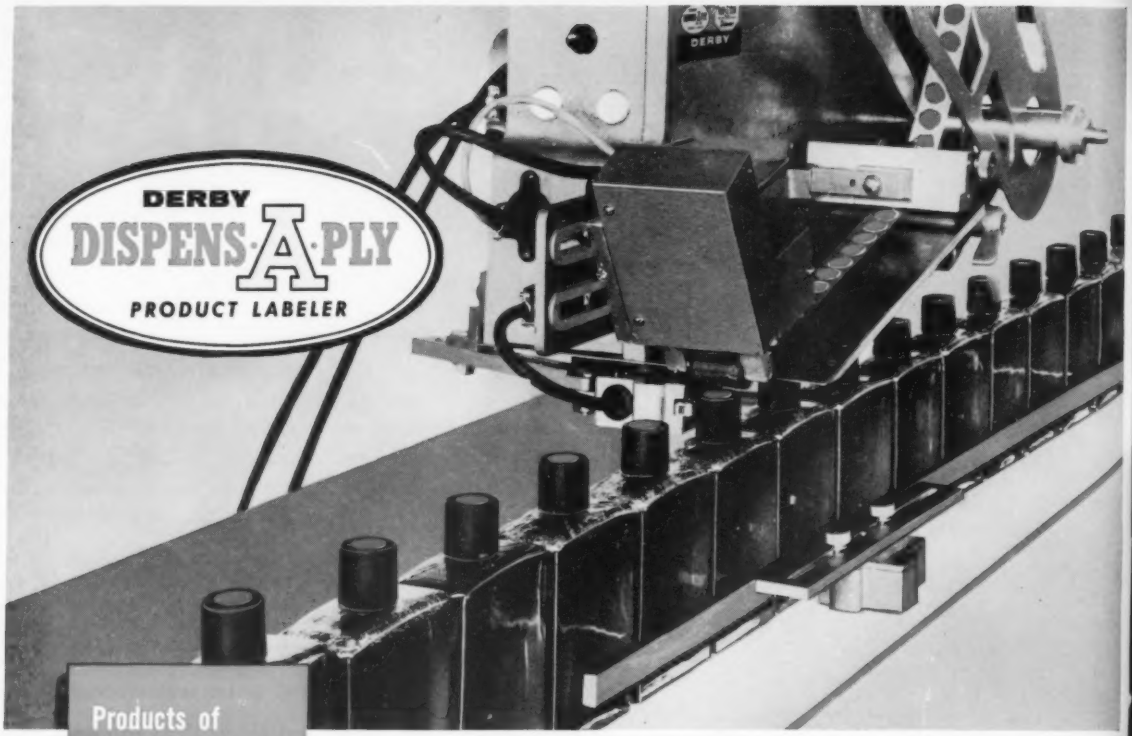

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Bring *Versatile Automation* to your labeling operation!

Speed Production Labeling . . . Cut Costs to a Fraction!

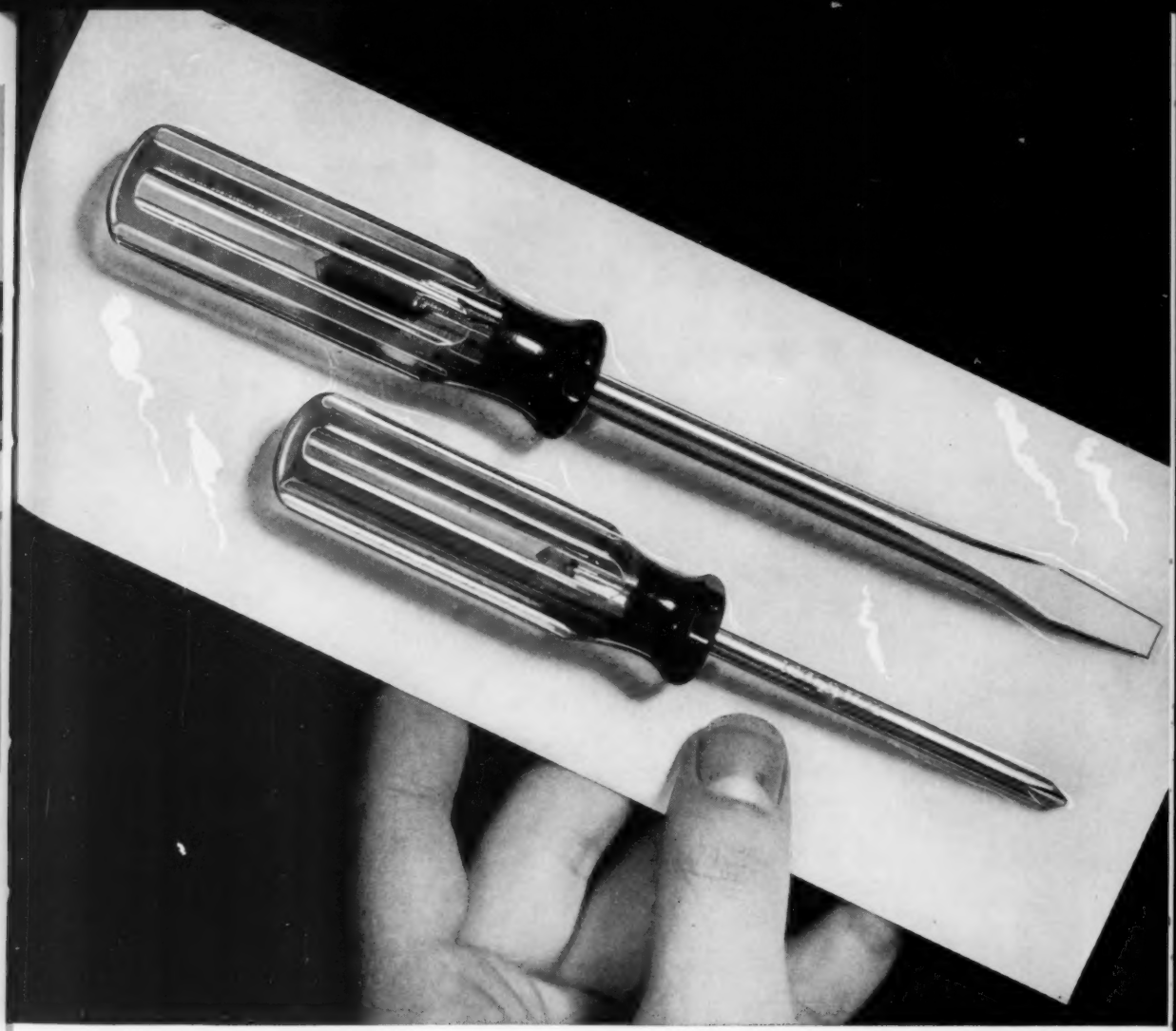
With the Dispens-A-Ply Product Labeler, Derby has created an entirely new concept of truly efficient production labeling . . . combining speed of application with accuracy of placement at lower costs. The versatility of the Dispens-A-Ply is exhibited by the wide variety of products that have been labeled or pre-priced with minimum of changeover time. Write for more information about this great advance in pressure-sensitive product labeling.

See the Derby Dispens-A-Ply in action at the 29th National Packaging Exposition in Atlantic City, April 4-7, Booth #325

DERBY SEALERS, Inc.

DERBY, CONNECTICUT

Designers and Manufacturers of the World's Finest Water Soluble and Pressure-Sensitive Tape and Label Dispensers



Polyethylene-coated acetate film for skin packaging has increased toughness . . . cuts costs

The economical skin packaging of larger, heavier items is now possible through the development of a new thermoforming film made by coating acetate film with polyethylene. This combination material is tough, as well as transparent. It produces packages with superior strength and excellent shelf life. It solves the problem of safe packaging for hardware, tools, machine parts, and other items of complex shape.

Improved Adhesion to Board

Polyethylene-coated acetate film eliminates the need for perforated or treated board. Bonding is improved. The superior thermoforming characteristics of this film combination result in excellent drawdowns around the item without webbing or tenting. Deep draws are possible, thus increasing the variety of products that can be packaged.

Economical

Skin packaging this improved way eliminates molds, attachment hardware, and fabricating and filling operations. Equipment for in-plant packaging can be set up at minimum expense—far less than that required for blister packaging.

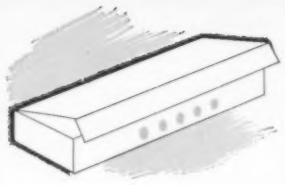
Polyethylene-coated acetate is not a Celanese product. It is produced by a number of converters, and available from them. For names of converters in your area write: Celanese Plastics Company, a Division of Celanese Corporation of America, Dept. 105-C, 744 Broad St., Newark 2, N. J. Celanese®

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver. *Export Sales:* Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N.Y. 16, N. Y.

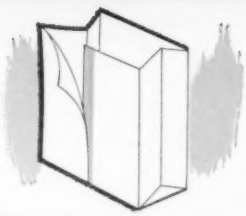
Acetate . . . a Celanese packaging film

For more information circle No. 208 on Reader Service Card, Page 117

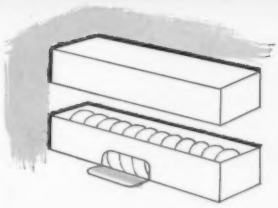
HOW THERMOGRIP® ADHESIVES ...Cracked six production bottlenecks



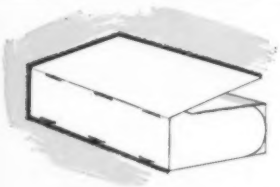
FASTER CLOSING, immediate handling, fewer closing lines on cigarette cartons. Carton can be opened without tearing for tax stamping. Production increased. Long pressure-drying sections avoided.



FAST SETTING, bag makers avoid squeeze-out — find increased machine speeds, less waste, improved product and production savings of 8-20% are just part of the gains made with THERMOGRIP.

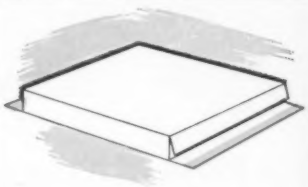


POSITIVE CARTON CLOSURE. THERMOGRIP on die-cut side flap sets fast, holds cover in place — eliminates 30 feet of pressure section — affords immediate handling — bonds foils and plastic coatings, too!

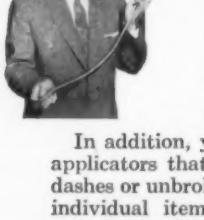


MULTIPACK MACHINE design is more compact, eliminates long pressure section, provides cleaner, more controllable adhesive system, immediate automatic removal of glued packs.

REGISTRATION ACCURACY for convertors. Production doubled, staples eliminated with THERMOGRIP on multiple part continuous business forms, saves many dollars per hour.



BEAT FIGHT in stiff boards on book and waxed food cartons with THERMOGRIP. Better control, easier to use, more compact adhesive system and good bond in split second.



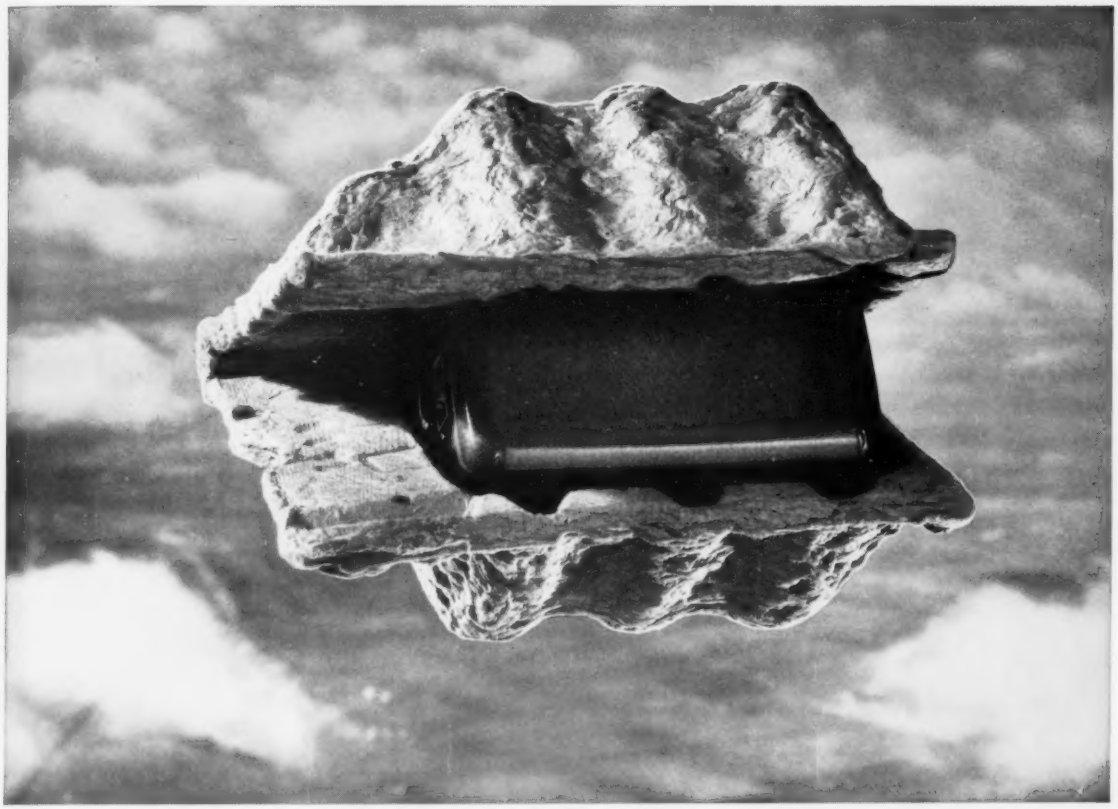
Instant bond on wide range of materials with THERMOGRIP adhesive gives you a control over tricky gluing jobs — lets you speed up operations. It's the only adhesive which comes in a dry, cord-like form for ease of handling and application.

In addition, you have a choice of six different applicators that can apply THERMOGRIP in dots, dashes or unbroken strip — to continuous webs or individual items. These are highly engineered units backed by more than 50 years' experience in the design and service of dependable production machinery.

Many firms are making spectacular dollar production savings. Others enjoy increased speed and cleanliness. Some jobs on hard-to-stick materials are being done with THERMOGRIP that are not possible any other way. Investigate THERMOGRIP today and see whether its many benefits can be yours! UNITED SHOE MACHINERY CORPORATION, 140 Federal Street, Boston 11, Mass., LIberty 2-9100.

United

Bemis Tekmold® packaging *floats* these converters safely to the customer . . .



and *cuts packaging costs 25%*

The experience of Terado Company, of St. Paul, with Tekmold Packaging is typical.

Previously, various models of Terado converters (they convert 6- and 12-volt storage-battery or automobile current into 110-volt AC) were encased in hand-folded, die-cut and scored corrugated board, then hand inserted in the shipping box.

Then Terado switched to Tekmold, the featherweight, molded pulp forms that *float* the product and cushion it from shock in all directions, while holding it firmly in place. Tekmold enabled Terado to slash labor costs a whopping *50 per cent!*

Tekmold is versatile. It is the ideal protective shipping package for a wide range of appliances, instruments, small machines, etc. And completely new and different applications may be developed for *your* product.

Write or phone us. Tell us your problem. We'll be glad to see whether we can help you.

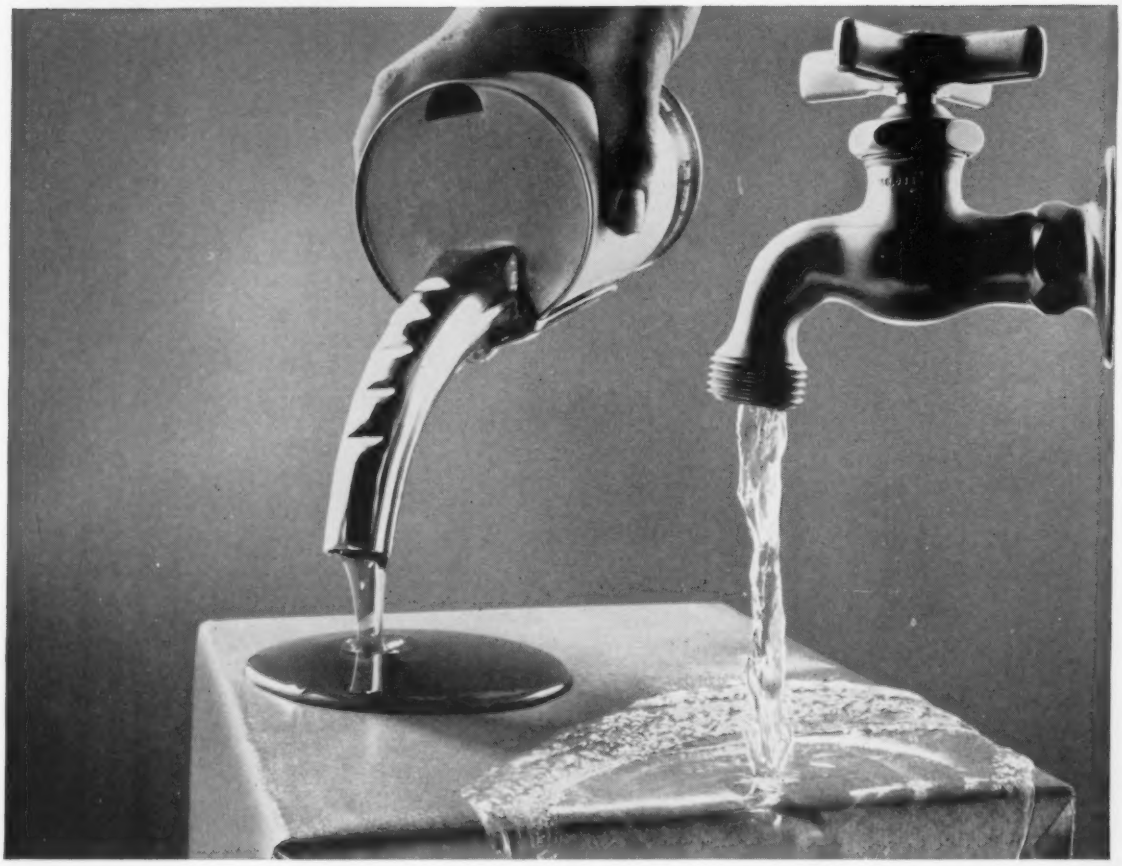
Photos of two Terado converter models, with their completely different Tekmold applications: one with end caps only; the other completely enclosed. In one instance, Tekmold replaced three hand-folded corrugated sheets; in the other, five sheets.

All Tekmold packaging is tailored for the specific job.

TEKMOLD PRODUCTS PLANT • BEMIS BRO. BAG CO.
Where flexible packaging ideas are born
325 27th Avenue, N. E., Minneapolis 18

3M COMPANY CHEMICALS

THE RAW MATERIALS OF PROGRESS



Paper resists oil, water—It's treated with SCOTCHGARD®

GREASE & OIL REPELLENT PAPER SIZE

Make a test like this yourself: Pour oil and water on paper treated with SCOTCHGARD Brand Grease and Oil Repellent Paper Size. See the liquids refuse to "wet" and "wick"—see the resistance paper has to them. This is practicality you can put into a package.

Put an end to oil-stained cartons and wrappings. Keep your packages neat . . . from packing through shipment, storage and point-of-sale. Do this without sacrifice of color, strength, porosity, flexibility or any other important characteristic. SCOTCHGARD Paper Size, one of 3M Chemical Division's family of fluorochemicals, penetrates paper fibers. It is not laid on as a film or coating. Chicago Rawhide Manufacturing Company uses treated paper to wrap greasy and oily parts and gets a neat and clean package as a result. International Harvester solved a 70-year-old penetration problem in its binder twine wrapping. Label and carton are now always readable, free of oil stains.

Here's what SCOTCHGARD Grease and Oil Repellent Size can accomplish for you: Give unparalleled resistance to asphalt penetration. Prevent unnecessary wax penetration on waxed papers. Permit use of thinner-than-normal polycoating. Permit packaging of greasy and oily parts without penetration. Prevent grease crawl and staining at seams and closures in multi-wall bags. "Hold out" dope and prevent strike-through in carbonizing tissue.

KEL-F PLASTIC FILM—FOR SEE-THROUGH, FLEXIBLE PACKAGES! Put paints, cosmetics, pharmaceuticals, chemicals into impermeable KEL-F Brand Plastic Film packages for heavy-duty protection without bulk. It's almost completely unaffected by heat, caustics, acids, temperatures. It's moisture-proof and shatter-proof. Withstands handling, storage, shipping. Gives maximum security, endurance, good looks and convenience.

In what way can SCOTCHGARD Paper Size and KEL-F Plastic Film help you package best? Write today to 3M Chemical Division for facts. Address inquiries to 3M Chemical Division, Department KCA-30, St. Paul 6, Minnesota.

"Scotchgard" and "KEL-F" are Reg. T.M.'s of 3M Co.

CHEMICAL DIVISION

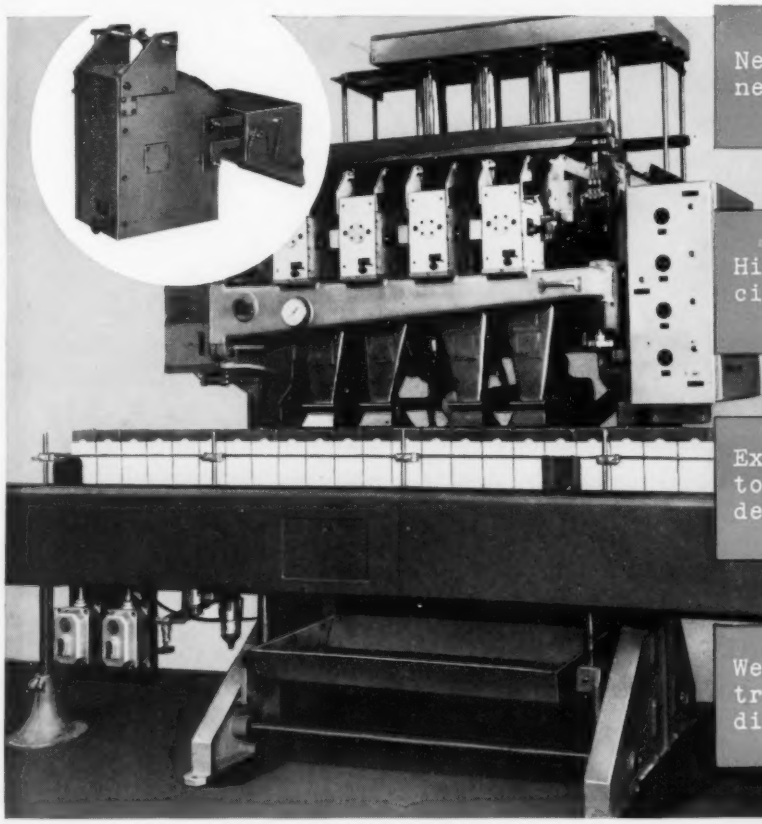
SEE YOU at the 29th A.M.A. National Packaging Exposition, April 4-7, Convention Hall, Booths 212-218, 222-230, Atlantic City, N. J.

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

THERE'S NO WEIGH LIKE PNEUMATRON!



Net weight accuracy never before attainable

High speed air circuit action

Extremely responsive to changes in product density and feeding rate

Weighing assembly travels only minute distance - .020"

Practical approach to instantaneous pressure weighing

Sensitive, yet durable, continual operation without change in accuracy

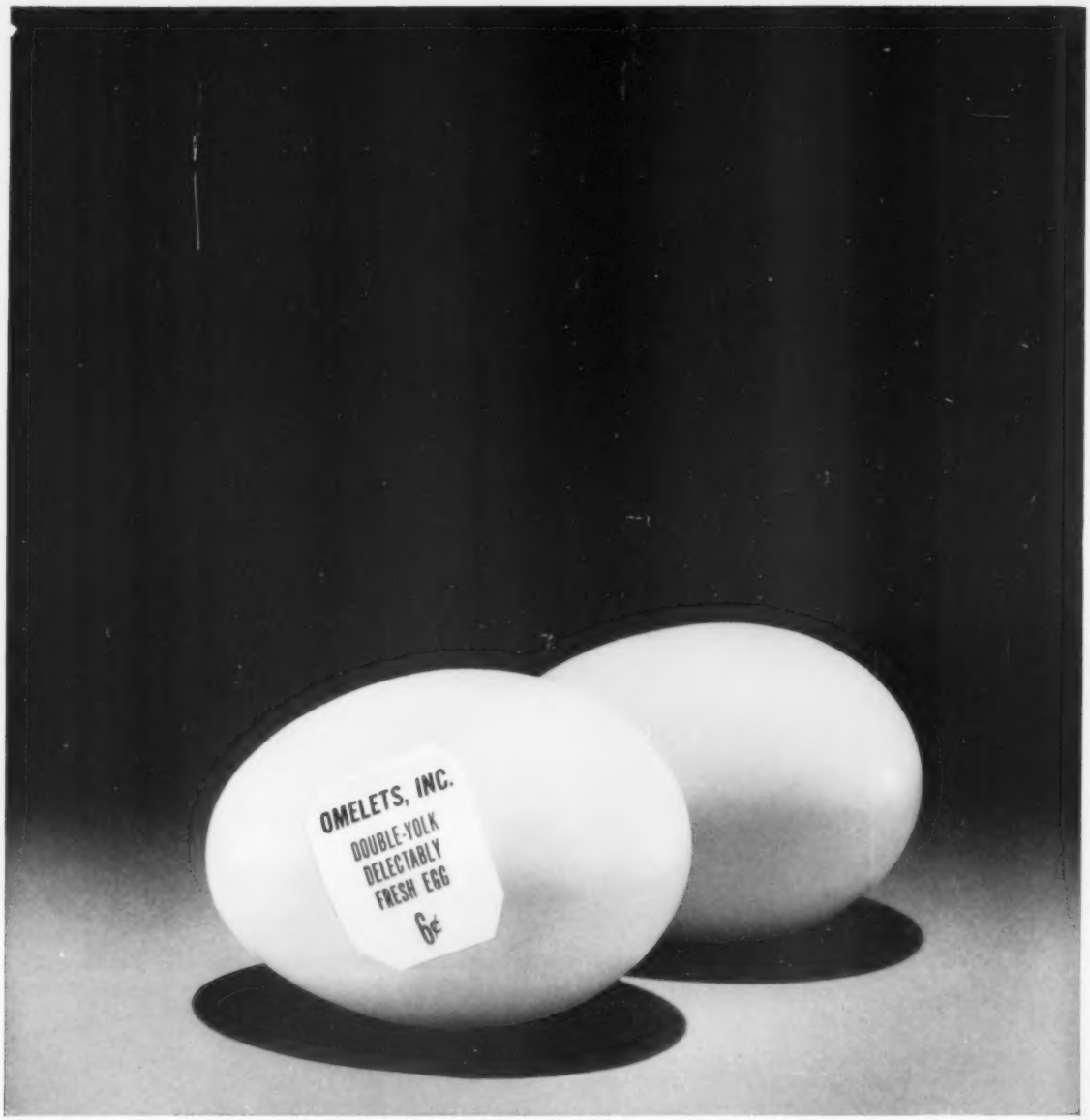
No weighing method ever devised offers the combination of speed, accuracy and dependability that is inherent in the revolutionary PNEUMATRON design. It establishes new standards of precision in net weighing. Available in two, four and six head models. Each head consists of a sensitive cantilever assembly and air control device for accurately detecting the deflected position of its receptacle as goods are filled.

Write for Bulletin #122 giving complete information.

PNEUMATIC SCALE CORPORATION, LTD., 77 Newport Avenue, Quincy 71, Mass. *Sales Offices: New York; Chicago; Dallas; Rochester. Agents: Fred Todt Company, Los Angeles, San Francisco and Seattle; Rockwell Pneumatic Scale Ltd., London N. W. 2, England; O. R. M. A. Paris, France. Subsidiaries: Delamere & Williams Co., Ltd., Toronto; Carbert Manufacturing Co., Inc., Cambridge, Mass.*

★PNEUMATIC

Packaging and Bottling Equipment



There isn't a package in the world that doesn't need a selling label

Two potential omelets—each in the most perfect package ever designed—yet which will sell first? The egg of unknown age, price and content or the one the consumer *knows* holds twice the goodness, fresh from the hennery, for only 6¢?
Soabar adds "selling pluses" like this to any package: with versatile marking equipment, geared to the speed of modern production and the varying requirements of today's diversification, with *flexible marking methods* that permit *split-second* imprint changes of your different information, with Soabar roll tickets and labels tailored to meet your individual needs for Identification, Content, Pricing, Shipping and Stock Control.
Now, in your own plant, you can imprint selling labels to suit your packaging rapidly, efficiently, economically, without skilled operators or costly inventories of pre-printed labels.

Visit Soabar at Booth No. 1204 at the National Packaging Exposition

Soabar company

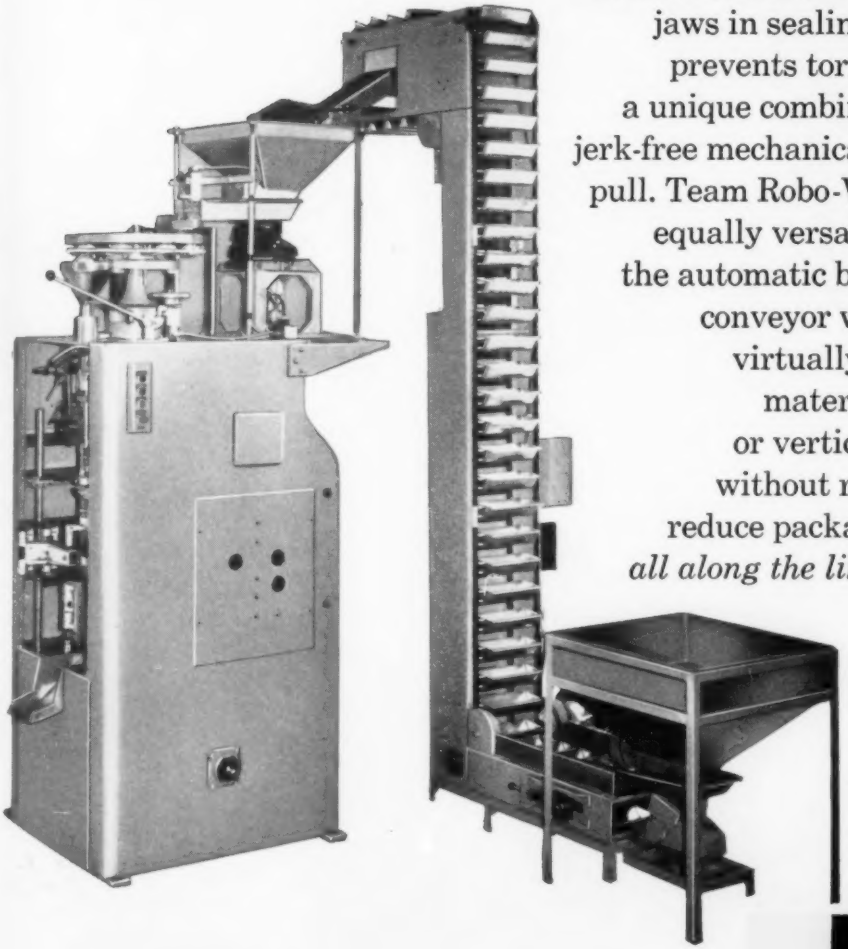
Specialists in Marking Equipment and Roll Tickets and Labels Since 1912

Soabar, 5812 Walker Street • Philadelphia 24, Pa.—In Canada distributed by The Jonergin Co., Inc. and W. J. Westaway Company, Limited.

ROBO-WRAP

Liquids, powders, solids, granules: Robo-Wrap versatility forms, seals and fills up to 120 poly, cello, paper, plastic or laminate pillow packs per minute, with a reject rate that's negligible.

New standards of sealing . . . an amazingly low down time record is being set by Robo-Wrap in the most demanding and highly automated installations throughout the country: the result of still another Lynch engineering advance—the unique hand-over-hand action which holds jaws in sealing position longer, prevents torn roll stock with a unique combination of strong, jerk-free mechanical and hydraulic pull. Team Robo-Wrap with the equally versatile Robo-*Lift*—the automatic bucket elevating conveyor which moves virtually any free-flowing material horizontally or vertically, gently and without re-handling—to reduce packaging costs *all along the line.*



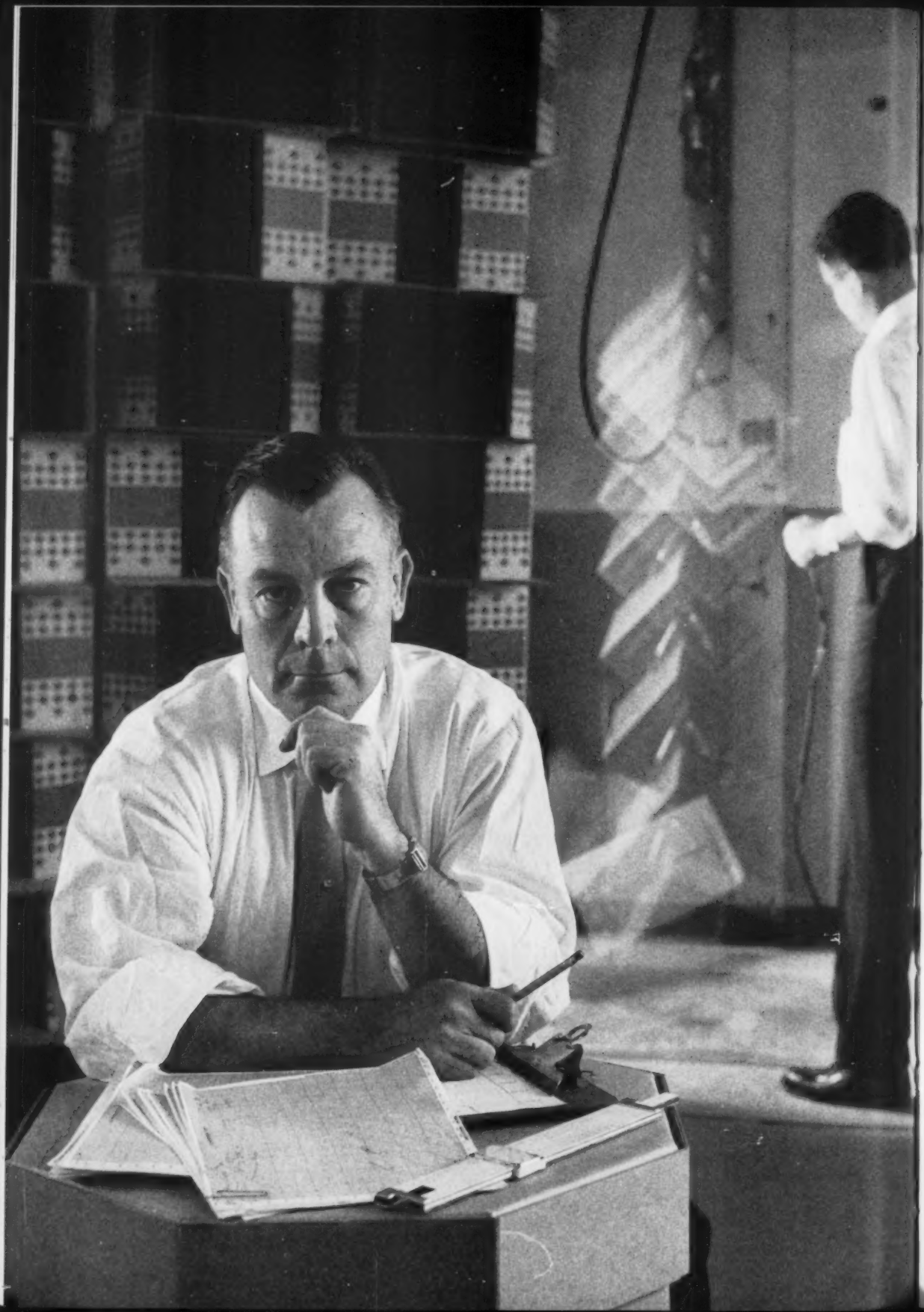
Write now for arrangements to see a Robo-Wrap, Robo-Lift installation in action near you.

LEADERS LOOK TO LYNCH—
FOR MACHINES THAT PACKAGE ALMOST ANYTHING!

Manufacturing Engineers of automatic processing equipment in the glass, packaging, plastic and other industries

ATLANTA • CHICAGO • SAN FRANCISCO
ENGLEWOOD, NEW JERSEY • DEFIANCE, OHIO

LYNCH
CORPORATION
Anderson, Indiana



His specialty is collision insurance

And making sure you don't collect on it.

With Thorne Kitchel there's precious little chance. The crash program he puts your containers through assures that the design and construction are adequate for your product before production begins.

Thorne heads up a team of seasoned "security analysts" at Union-Camp's packaging laboratory. In his 15 years as a corrugated box specialist, he has tested thousands of boxes designed to protect all kinds of products. He's also helped save thousands of damage-claim dollars for their owners in the process.

At the Union-Camp packaging proving ground, Thorne and his staff test new shipping containers for their ability to withstand almost any conceivable threat to product safety. Sudden rail-car stops and starts, for example. Punctures from sharp objects. Resistance to extremes of temperature. Accidental falls. Vibration. Or the extent to which a shipping container will protect your products under the crushing pressure of high stacking.

Even the components and materials that go into your box must run the gauntlet before they are used. They are tested individually—then in relation to each other to determine the combination of properties that will insure maximum safety for your product . . . whatever it may be, wherever it may be shipped.

This comprehensive quality control program is just one part of Union-Camp's complete corrugated service available to all shippers. The service also includes box development and design—both construction and visual. It provides specifications control, art and merchandising counsel as well as a study of your packaging operation and many other features that can help you move and market your products more effectively, more economically. And it doesn't cost a penny extra.

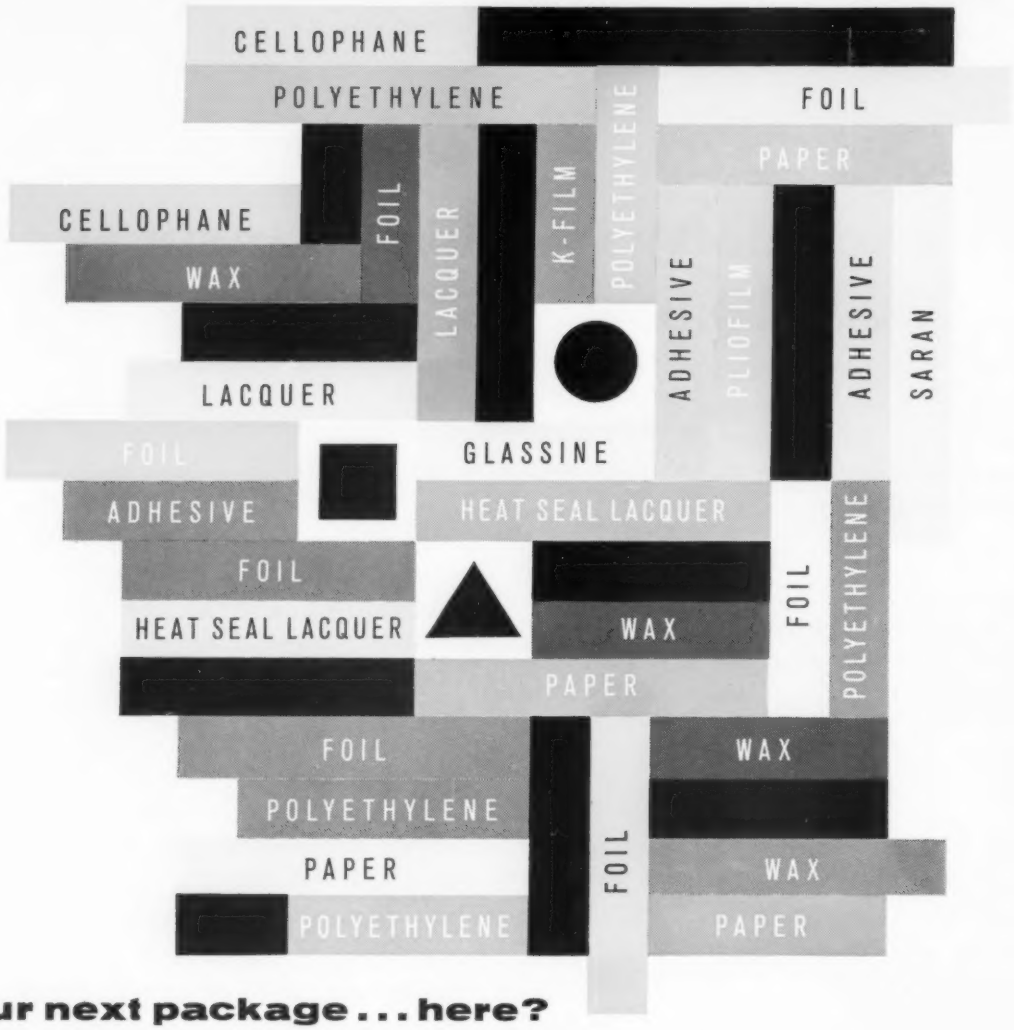
Your Union-Camp man will be glad to give you full information. Case histories are on file that show what we have done for companies like yours. A note on your letterhead will bring a prompt reply.

UNION-CAMP®

CORRUGATED BOXES

Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

Plants: Savannah, Georgia · Trenton, New Jersey · Chicago, Illinois · Lakeland, Florida · Spartanburg, South Carolina · Jamestown, North Carolina
Subsidiaries: Allied Container Corporation, Dedham, Massachusetts
The Eastern Box Company, Baltimore, Maryland.



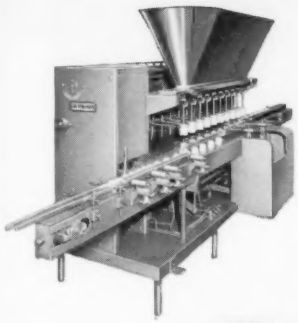
Your next package . . . here?

Yes, here! A Milprint custom combination of two or more of these materials can give your product better protection and more sales appeal with economy of cost. Pioneer in flexible packaging, Milprint approaches your package problem with an open mind. There's no attempt to steer you toward any particular material or process because *Milprint offers you the widest variety available anywhere.*

Give your next package the advantages of unlimited choice of materials, printing processes and experience which is uniquely Milprint. Use our nationwide network of research, design and production facilities and you'll agree . . .

MILPRINT PACKAGING *gives your product* **MARKETING POWER**

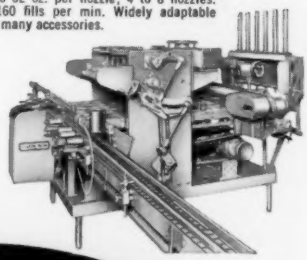
MILPRINT Inc., World's Most Imaginative Flexible Packaging Service, General Offices, Milwaukee, Wis., Sales Offices and plants conveniently located across the nation.



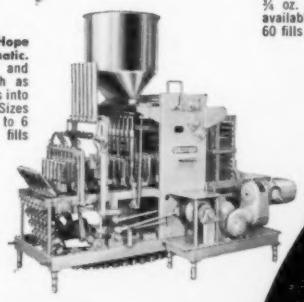
No. 19A Colton-Hope High-Speed Automatic. Fills liquids, creams, pastes into bottles, jars, cans. ⅛ oz. to 32 oz. per nozzle; 4 to 14 nozzles. Up to 250 fills per min. Many accessories available.

No. 15RF2 Colton-Hope Two-Line High-Speed Automatic. Fills liquids, creams, pastes into glass, plastic, tin, paper containers. ¾ oz. to 32 oz. per nozzle; 1 or 2 nozzles available. Many outstanding features. Up to 60 fills per min. Many accessories available.

No. 19 Colton-Hope High-Speed Automatic. Fills liquids, creams, pastes into bottles, cans, jars. Excellent for filling, top-finishing, disc-placing in cosmetic cream work. ⅛ oz. to 32 oz. per nozzle; 4 to 8 nozzles. Up to 160 fills per min. Widely adaptable through many accessories.

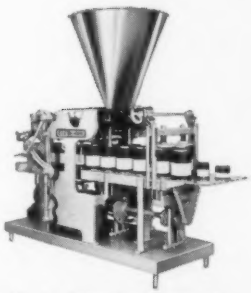


No. 27 Colton-Hope Heavy-Duty Automatic. Fills high viscosity and ropy materials such as caulking and greases into tubes or cartridges. Sizes up to 2" x 10"; 2 to 6 nozzles. Up to 90 fills per min.

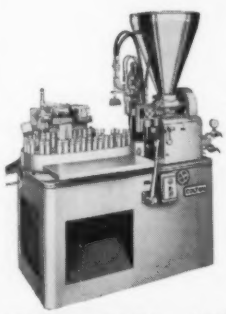


The money-saving precision of **COLTON exacto-metric filling** plus **high operating speed** make basic Colton fillers the big buy

These basic fillers typify the wide range of filling covered by the Colton line—most complete and versatile in the world. Such basic machines, readily adaptable to individual application by means of accessories engineered to the machine, give, in effect, a custom-engineered machine at standard machine price. It is this adaptability that enables us to say "Colton fills practically ANYTHING into ANYTHING." Many other Colton fillers available. Write for Filling Machine Application Data Sheet. Detailed specification sheets available. Arthur Colton Company, 3400 E. Lafayette Ave., Detroit 7, Michigan. Sales and Service offices throughout the country. Plants: Detroit, Mancelona, Elk Rapids, Michigan.

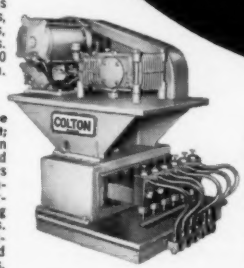


No. 21 Colton-Hope Single and Twin Automatic Conveyorized Heavy-Duty Filling Machine. For filling liquids, creams, light and heavy pastes such as paints and similar products into jars and cans. Production up to 10 cycles per minute per nozzle. Fills up to 1 gallon per nozzle. 1 and 2 nozzles available. Paint can lid dropping and pressing features available.



No. 175 Colton Automatic Tube Filler, Closer and Crimper with Ejector.* Fills liquids, creams, pastes into tubes, small bottles, jars, cans. Cleans, fills, folds, crimps, ejects. Various fillers offer 30 to 300 tubes per min. per machine.

***No. 176 Plastic Tube Sealing Attachment;** low cost conversion unit to replace standard folding heads on Models 17TF and 175TF machines. Gives dual-purpose machine handling metal or plastic tubes. Model 172 Colton exclusively for high speed sealing of plastic tubes.



Series 100 Colton High-Speed Multiple Liquid Fillers, (for bench or conveyor belt use). Fills liquids into jars, bottles, cans. Up to 4 fl. oz. per nozzle; 4 to 12 nozzles. Up to 480 fills per min. Can be manifolded for larger fills. Extreme accuracy, high production in a low-cost machine.

Call Colton
FOR EVERY FILLING NEED

COLTON fills practically ANYTHING into ANYTHING

For more information circle No. 217 on Reader Service Card, Page 117

A Flavor Retention Test on Cookie Packaging . . . typical of hundreds conducted at Du Pont's Film Department Technical Laboratories to evaluate freshness protection offered by various cellophanes.

Tests like this help Du Pont develop cellophanes that lock in flavor and freshness longer

Does your package have to block the escape of volatile oils and flavorings . . . keep cookies, chips or cereals crisp . . . or prevent sugar crystallization and powdering of hard candies or hardening of marshmallows?

Name the protective job your package must do. There's a special Du Pont cellophane to do it, to protect and keep your product at the peak of appeal—from factory, to warehouse, to retail store, to consumer.

The superior, new polymer-coated Du Pont "K"* cellophanes, for example, lock in flavor far longer . . . combine unique protective properties with brilliant transparency, extra durability. And, like all of Du Pont's over 100 types of cellophane, they give you top high-speed machine performance.

Tests like the one shown above assure that you get the cellophane tailored to meet *your* needs . . . when you specify Du Pont cellophane by the proper code designation.

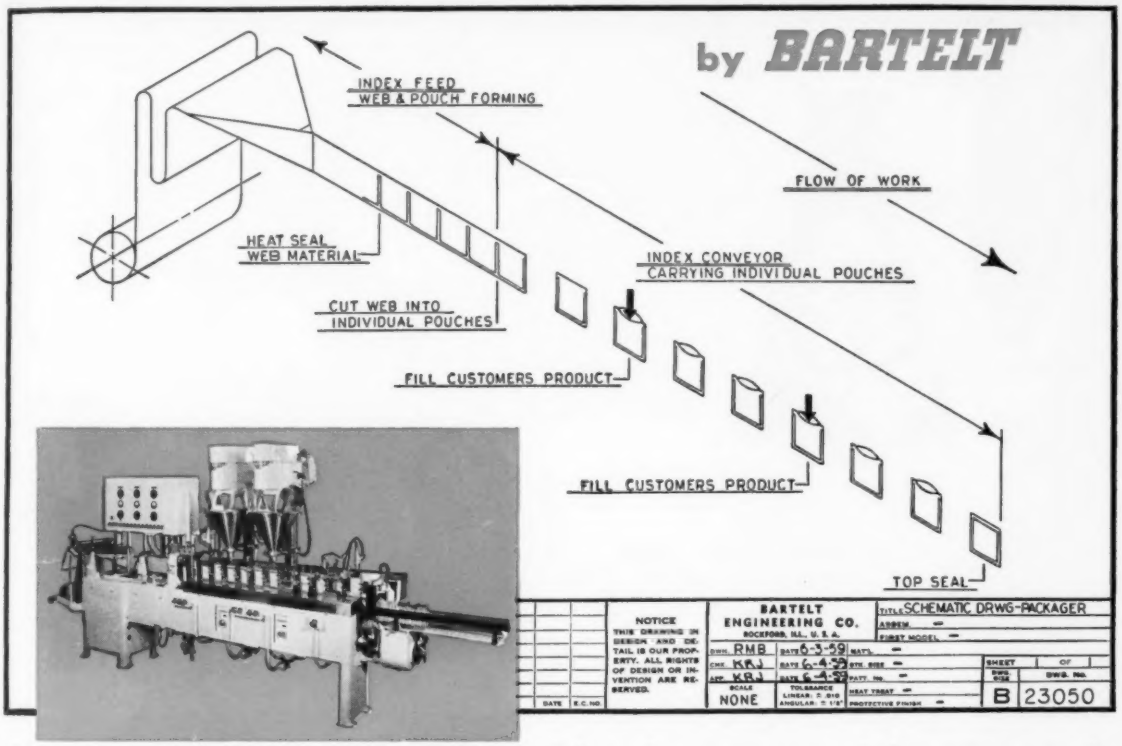
Du Pont can help you with your packaging problems. Talk to your Du Pont Technical Representative. *Ask for the Du Pont booklet, "Properties and Uses of Cellophane".* Or write: Du Pont, Film Dept., PE-3, Wilmington, Del.

**Du Pont Trademark*

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

DU PONT cellophane

DESIGN FOR SUPERIOR FLEXIBLE PACKAGING!



Horizontal Work Flow Provides Important Advantages in Fabricating High Strength Flexible Pouches...

Study the drawing above and the points listed below. *No other flexible packaging machine can provide you an operation with all these important advantages!*

1. Forming of the web is *completed* prior to bottom and side sealing. Thus, no forming stress interferes with proper sealing . . . no built in pleats or tucks occur and superior seals are assured.

2. Side and bottom seals are *set* before cut-off, pouch opening, or filling takes place . . . Seals cannot be weakened by product contamination, or stress caused by cutting, opening or filling while seals are hot and plastic.

3. Filling takes place in a station designed for filling only. Thus, product contamination of cut-off knives, seal bars or other tooling is negligible. The only thing below the fill station is the stainless steel dust cover and spill chute.

4. There are several stations available for the application of special tooling: cooling bars, perforating blades, partition seal bars, top fold mechanisms, tear string and saddle label applicators, die cutting tools as well as special filling devices.

5. Top sealing also takes place in a position of its own, well removed from the filling operation to avoid seal contamination. The preceding few stations are free and available for paddling and pouch stretching so that the pouch is presented flat and ready for an undistorted top seal.

6. This logical and practical sequence approach means that each operation not only has its own position, but its own mechanism designed for one operation only. The absence of complex double or triple duty mechanisms substantially reduces maintenance problems and costs while it increases operation efficiency.

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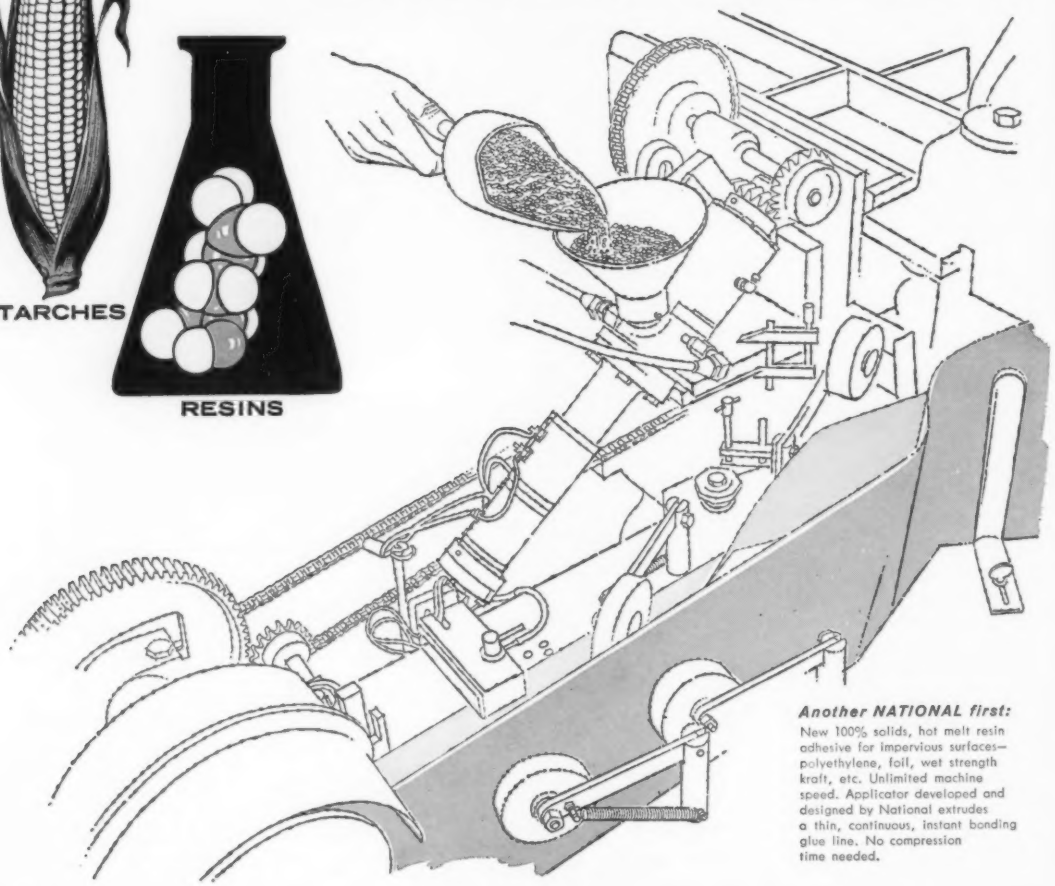

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New 100% solids, hot melt resin adhesive for impervious surfaces—polyethylene, foil, wet strength kraft, etc. Unlimited machine speed. Applicator developed and designed by National extrudes a thin, continuous, instant bonding glue line. No compression time needed.

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This unique "cross pollination" of genetics, synthetics and advanced thinking has resulted in a wealth of know-how, not generally possessed by individual packaging companies.

NATIONAL's "cross pollinated" technical service is available for the asking . . . to help build product features that become decided competitive advantages for you.

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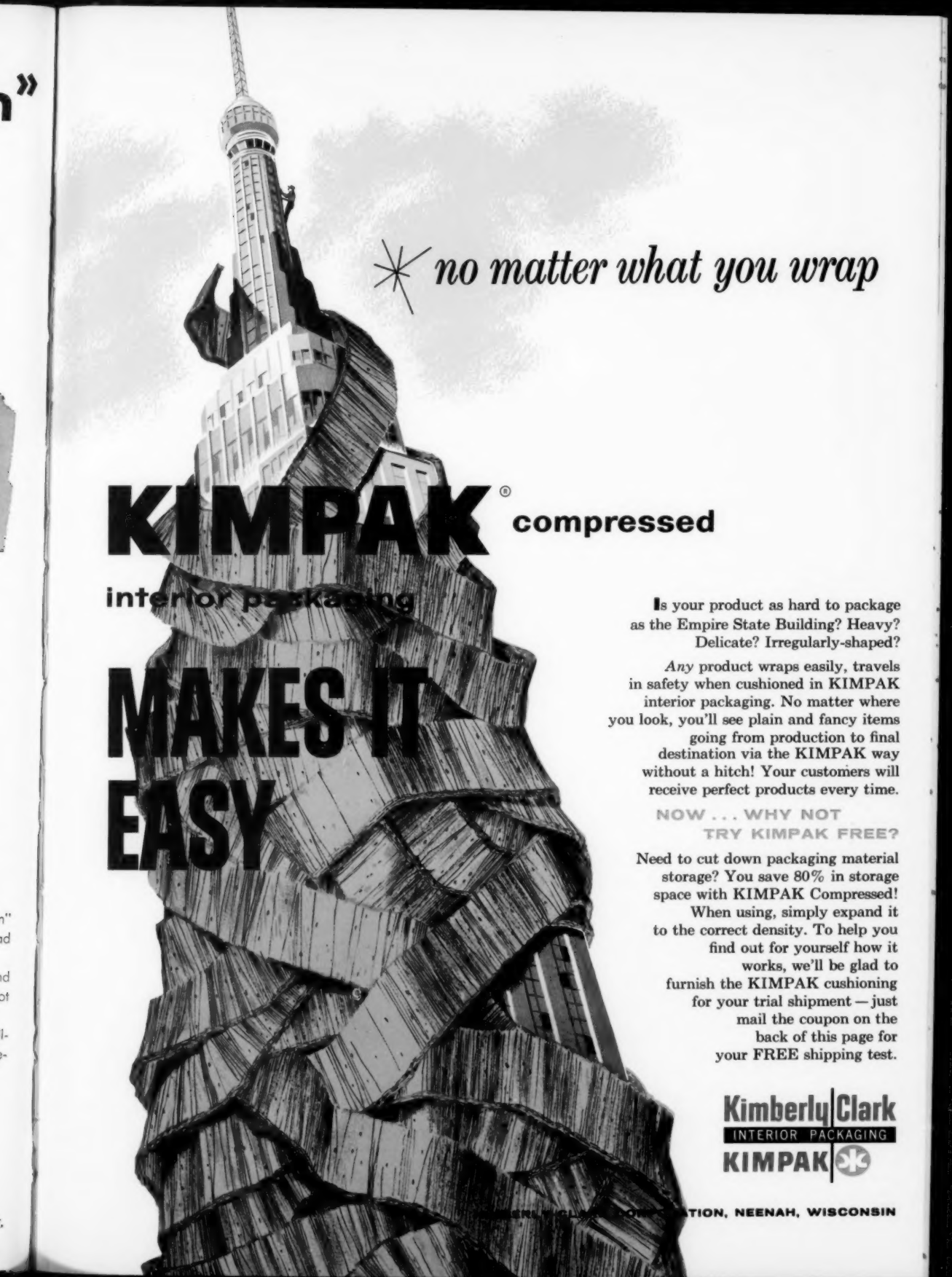

no matter what you wrap

KIMPAK® compressed

interior packaging

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Is your product as hard to package as the Empire State Building? Heavy? Delicate? Irregularly-shaped?

Any product wraps easily, travels in safety when cushioned in KIMPAK interior packaging. No matter where you look, you'll see plain and fancy items going from production to final destination via the KIMPAK way without a hitch! Your customers will receive perfect products every time.

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Need to cut down packaging material storage? You save 80% in storage space with KIMPAK Compressed! When using, simply expand it to the correct density. To help you find out for yourself how it works, we'll be glad to furnish the KIMPAK cushioning for your trial shipment — just mail the coupon on the back of this page for your FREE shipping test.

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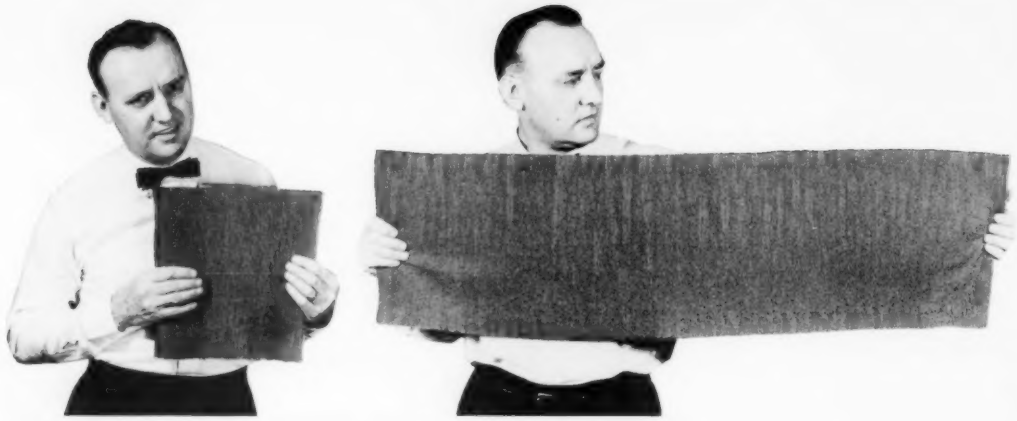

KIMPAK®

compressed interior packaging

expands five times
saves at least 80%
in storage space

Cancel out ineffective, costly packaging methods . . . save 80% of your storage facilities! In a unique process, as saving of space as microfilming, Kimberly-Clark has reduced storage of cushioning material to *1/5th its "in-use" volume!* When expanded for use, KIMPAK fills all voids, wraps around delicate points and projections, molds into cavities. With KIMPAK, your irregularly shaped products can travel in *standard* cartons without shifting or jolting.

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Shock, scratch, weight, and thickness comparisons can be made right at your desk, while you watch. Our field technicians will bring the equipment to your office for a demonstration of KIMPAK'S technical performance. Just check the coupon below for a free demonstration. Ask, too, for your free "test shipment" sample.

KKD-68

Dept. No. PE-3, Kimberly-Clark Corporation, Neenah, Wisconsin

product is _____. At no obligation or cost to me:

Please provide sufficient KIMPAK Compressed for test shipment.

Bring portable laboratory kit for making shock, thickness, and scratch tests at our offices.

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CKSMF packs 24 307 x 510 cans, 4 x 3 x 2. The 1- or 2-tier selector also allows 4 x 3 x 1 pack. Change parts adapt for 300 x 407, 303 x 406. Positive control positions cans properly, prevents twisting, assures full pack.

B&M speeds production..cuts operating costs 20% with Crompton & Knowles Can Packers

"We purchased our first C&K Can Packer in May, 1956," says Mr. Dougald MacDonald, Vice President in Charge of Production, Burnham & Morrill. "It did the job we expected it to do, and since then we have added two more. All three are operating to our satisfaction." Thanks to these C&K Packers, operating costs are down 20%, and production is up to 25 cases a minute. At the same time, fewer workers are needed. Versatile Crompton & Knowles equipment now packs 7 different B&M can sizes. And C&K's gentle handling of cans greatly reduces rejects due to label damage.

C&K not only provides extensive services to the can packing industry, but also manufactures a complete line of high-speed WRAP-KING wrapping machines to handle both simple and complex shapes. For any packing or wrapping problem, you'll do well to investigate C&K. Get full details, including leasing plans, by writing Crompton & Knowles Packaging Corporation, Holyoke, Massachusetts.

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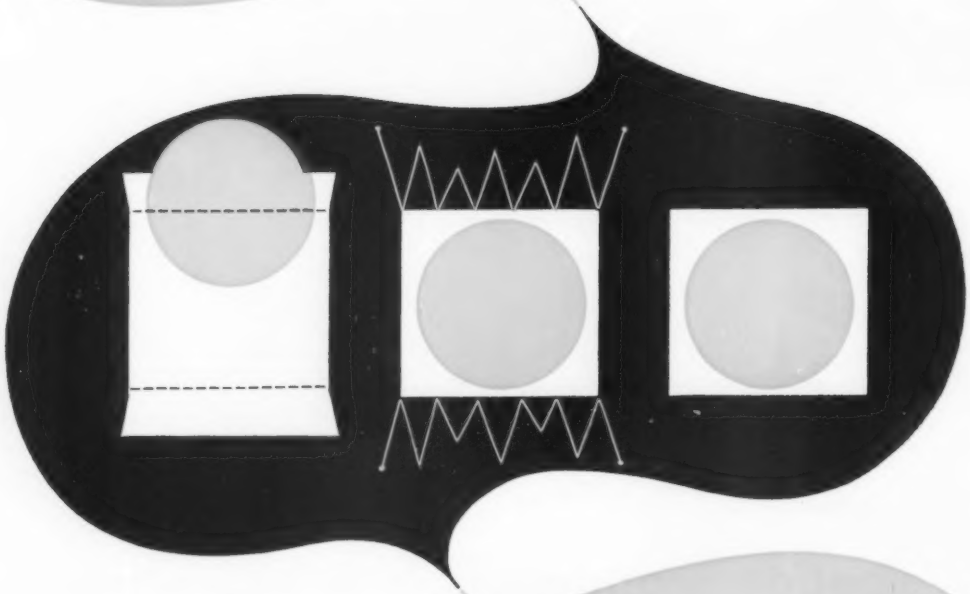
PACK IT

WITH RADIO WAVES



CCA's new Di-Electric Sealer positively seals cartons by the heating action of radio waves on cold glue.... High-frequency waves eliminate de-waxing necessary with conventional sealing methods—and unwieldy overwraps. Provides fast, smooth production, plus protection and merchandising advantages. To **pack it—move it—sell it** is the business of CCA packaging. For details...

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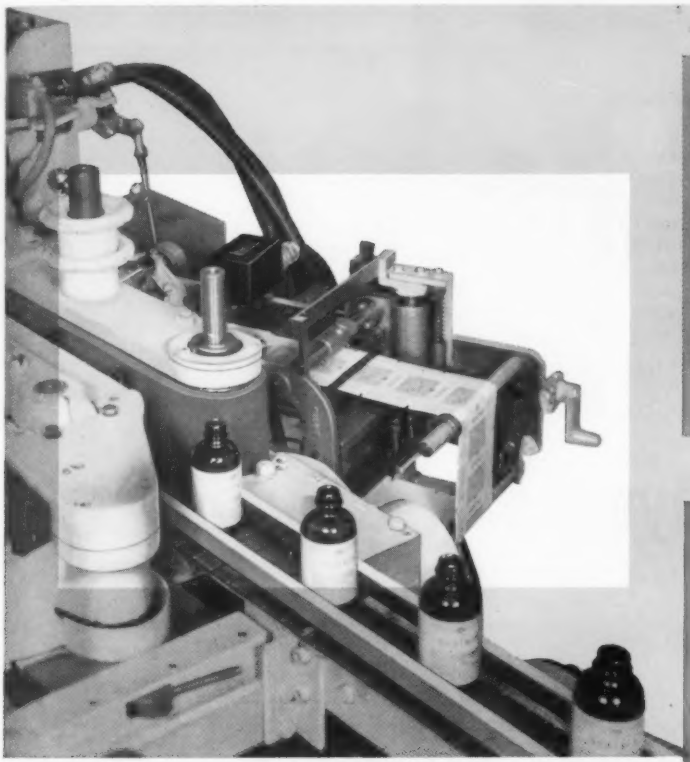
Chicago 3...and all key marketing areas. Folding Cartons, Shipping Containers, Sefton Fibre Cans, Molded Plastic Products

New roll feed "no glue" labeling

Automatic verification, coding, protection and control



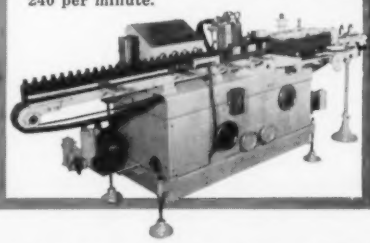
Shown here is the imprinting and coding head and electric eye controlled cut-off.

The Label-DRI Challenger complete with electric eye-controlled roll label feed. Speeds up to 120 per minute.

Also available:

The Semi-Automatic Pony Label-DRI. Speeds up to 60 per minute.

The Label-DRI Champion. Speeds up to 240 per minute.



Three New Jersey Label-DRI models now available

You get fast, fool-proof "no glue" labeling with these new roll feed Jersey labelers.

1 **Automatic label verification**—Once the first label has been checked, you know all other labels in the same continuous web must be the same.

2 **Automatic label coding** – Each label gets a clear imprint just before being applied to the container.

3 **"No-glue" labeling** – Labels in roll form are printed on thermoplastic label stock. You eliminate adhesive coating and are sure of more attractive label application.

4 **"Greater labeling efficiency"** – Eliminates mechanical separation of labels. No hopper to be set or reset to take care of label-cutting variations. No "doubling" due to "cling" caused by static electricity – ink offset – or dull cutting.

Check the Jersey Label-DRI that's best for you. Ask for details and a demonstration.

MAKERS OF THE PONY LABELRITE — NJM — NEW JERSEY MACHINE CORP

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For more information circle No. 224 on Reader Service Card, Page 117

BREAKAGE MINIMIZED: Sutherland Paper Company's seasonal paper plate business requires long storage periods. Polyethylene ended long-time problems of wrappers drying out, embrittling, splitting and puncturing. Customer complaints and returns have sharply diminished. Overall costs are reduced.

HIGHER CUSTOMER APPEAL: A Cinderella Knitting Mills, Inc. customer comments that polyethylene wraps give underwear "a richer appearance and an infinitely softer feel." And this means business. R. Wise, President, reports: "We experienced a 15 to 20 per cent increase in sales, attributed directly to the appeal of garments wrapped in polyethylene over garments wrapped in other films."

See how polyethylene overwraps

FRESH-FEELING LONGER: Since Cushman Baking Company began using polyethylene overwraps, bread returns have decreased, sales increased. Housewives are reported buying more because polyethylene keeps bread soft longer, prevents drying out. Re-wraps have been less than with either of the wrapping materials previously used.

4-WAY BENEFITS: Film softness is but one of four major reasons Pomona Paper Products, Inc., switched to overwrapping its "Marcal" napkins with polyethylene. Company President Paul R. May also looks forward to reduced packaging costs, top resistance to climatic effects, less wrapper breakage. A feature of this package is an easy-to-open tear strip.

SOFT TEXTURE SELLS: I. C. Herman & Co., Inc., credits the softer luxurious feel of polyethylene with helping increase the sales appeal of its men's handkerchiefs. Polyethylene solved inventory problems too. S. Trachtenberg, Packaging Director, says: "For the first time, we can give our retailers the important handkerchief display quality of tray-pack gift appeal *plus* package durability."

For more information circle No. 225 on Reader Service Card, Page 117

COSTS LESS: Daniel M. Brown, General Manager, Royal Wove Envelope states: "Frankly, we went to polyethylene because it costs less than other transparent films. The results—no breakage no returns—prove our decision was wise." One of the firm's oldest and best distributors notes: "This is the first time we have not received at least some returns of packaged envelopes sent to retailers."

SALES UP—COSTS DOWN: Southern Maid Paper Company switched from wrapping its school papers with paper bands to automatic wrapping with polyethylene. Results: Production is up 20%, production costs down 33%, sales up 50%!

can cut your costs, boost sales!

These consumer product manufacturers are:

• extending product shelf life • reducing breakage returns

• increasing sales appeal • cutting costs • boosting sales

Chances are good—and these success stories are the evidence—that you too can get these important advantages by switching to automatic overwrapping with tough, sparkling, transparent film of BAKELITE Polyethylene. Why not investigate? See your packaging supplier. Or write for our *two* special booklets on polyethylene film for automatic overwrapping. Dept. **CM-02M** Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York. *In Canada:* Union Carbide Canada Limited, Toronto **7.**

UNION CARBIDE

BOOST DEMAND: When Top Flight Paper Products, Inc., began overwrapping stationery and envelopes with polyethylene, they had to increase production 700% to meet the sales demand. Also, packages no longer tear open or become shabby looking. E. Montgomery Robinson, Vice President, states: "Polyethylene has transformed our packaging operations."

Get the up-to-date story on polyethylene flexible packaging at the Packaging Show. See us at Booth 353.

BAKELITE and UNION CARBIDE are registered trade-marks of Union Carbide Corporation.

Planned Packaging moves merchandise

Why not your brand?

See the "wrap-around" end panels on this new carton? They give beer and other pack users all-important end panel identification—usually a premium feature—for the cost of regular open-end cartons. Important? Vital! Thirty-five per cent of all store pack displays show carton ends only!

The new "Contour-Pack," an exclusive, new design development by Packaging Corporation of America, offers better sales, lower package cost, faster packaging.

This is but one of countless ways in which Packaging Corporation of America's concept of Planned Packaging, implemented through integrated national facilities, produces better packaging . . . more sales. Whether your requirements are large or small, regional or national, we welcome the opportunity to help you.

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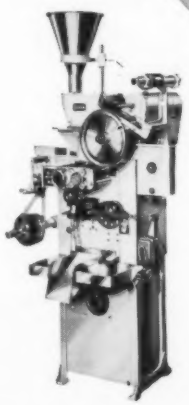
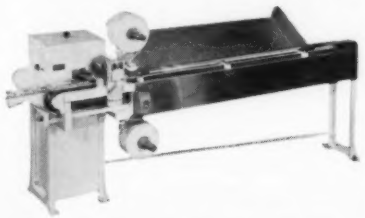
Administrative Offices: Grand Rapids, Michigan; Quincy, Illinois; Rittman, Ohio

Cartons • Containers • Displays • Egg Packaging Products • Molded Pulp Products • Paperboards

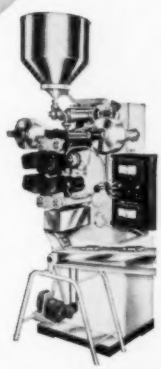
PKK . . . for powders, grainy products like tea and spices in portion packages; 5000-14,000 packages per hour; heatsealing cellophane, aluminum foil, cotton paper, etc. Sizes to 2 15/16" x 6 3/16".



TMK . . . for tablets and similar objects in strip at speeds up to 18,000 an hour. Works with heat-sealing cellophane, aluminum foil, other materials, handles tablets up to 1½" diameter.



IMK . . . for toothbrushes, sawblades, lollipops, ice cream sticks and other similar products at up to 65 per minute in paper or foil. Saves paper, makes attractive package.



KIPAK . . . for liquids, powders, granular substances; 2500-5000 packages per hour; cellulose film, aluminum foil, cellophane, acetate, Saran, Pliofilm, etc. Sizes from 1 3/16" x 1 9/16" to 5 5/16" x 17 9/16".

Other ***Kisab*** machines include . . .

VFK-VFK/b . . . for heatsealing cellophane, polyethylene, pliofilm and other foils or papers treated for heatsealing. VFK is delivered complete with motor, gearbox and controls; VFK/b comes without electricals.

HFK . . . for hand filling into tubes, tins and similar containers of mustard, pastes, creams and products of similar viscosity.

PFK . . . for automatic filling of dry products such as powder, crystals, pastilles.

Arenco introduces the new KISAB line of high speed packaging machinery

Designed and built to the highest standards of Swedish craftsmanship, these new ***Kisab*** machines package everything from liquid to lollipops in a wide variety of wrapping materials. After you have checked the speeds and other specifications listed above, you'll understand why alert American packagers will be installing these new machines as fast as Arenco can deliver them! Parts and service are never any problem—Arenco maintains an expertly staffed fully equipped service plant right here in the U.S. Write today for information.

ARENCO MACHINE COMPANY, INC.
25 West 43rd Street
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MANUFACTURERS OF FILLING, CAPPING, SEALING AND PACKING MACHINES

Rhinelander Glassine and Greaseproof *papers*

Here are versatile papers that economically provide basic protection essential to good packaging . . . foods in wide variety, pharmaceuticals, and industrial products . . . from cereals to tea . . . bandages to piston rings.

For example, the nickel still buys a lot of candy bar . . . but the low retail price demands packaging calculated to the fraction of a cent. Rhinelander Glassines and Greaseproofs, widely used, provide efficient low-cost protection, attractiveness and merchandising appeal, with good printability and trouble-free operation in high-speed automatic packaging.

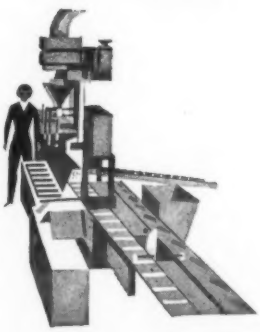
Inherent barrier properties of Glassine and Greaseproof papers make them ideal for diverse packaging chores.

LOOK AND EVALUATE!

1. Greaseproofness
2. Oil and fat resistance
3. Vapor and odor resistance
4. High tensile strength
5. Wide range of basis weights
6. High gloss and smooth finish (Glassine)
7. Transparency, opacity, variety of colors
8. High density
9. An excellent coating base and printing surface
10. High ratio of mullen to basis weight
11. Compatibility with other packaging materials
12. Approved wet-strength properties

The built-in characteristics differentiating Glassine and Greaseproof from other papers may be enhanced by conversion. Coating, waxing, laminated combinations . . . and the addition of extra properties . . . heatseal, water-vapor resistance, gloss and release properties.

Glassine and Greaseproof are truly remarkable papers . . . available in standard grades or tailor-made to exacting requirements.



AMONG THE MANY APPLICATIONS FOR GLASSINE AND GREASEPROOF . . .

Carton liners and dividers
Bags and bag liners
Package overwraps
Board lining
Unit packaging
Carton inner wraps
Canister and fiber tube laminations
Candy and cookie cups
Retail food service wrap
Package accessories and labels
Corrugation

Write for samples and full information stating application or requirement.

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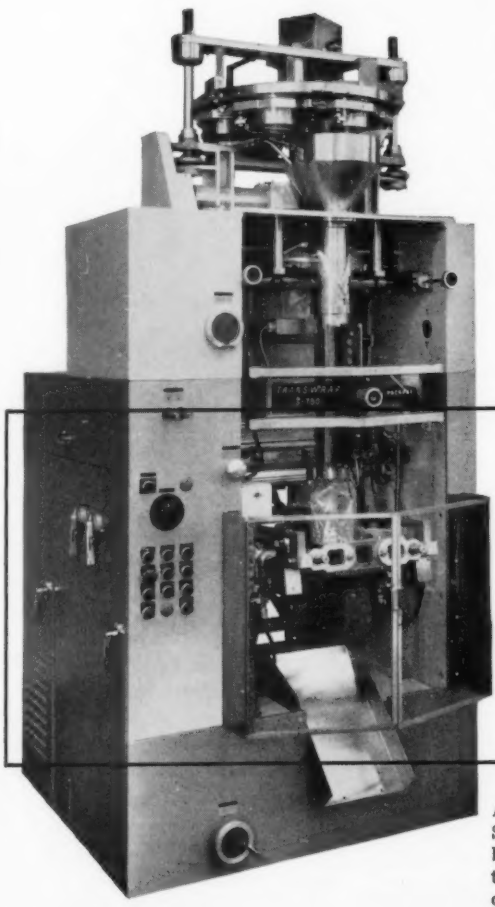
10 BIG REASONS

why the Transwrap S-750 is best for frozen food bag packaging



- **Up to 75 bags a minute.** Convenient handwheel regulates speed from 25 to 75 bags per minute.
- **Modern push-button controls.** Centralized controls provide utmost convenience, simplified operation.
- **Wide size range.** Forms bags 3″ to 15″ long, 2″ to 8½″ wide. Bag change-over time reduced to less than 15 minutes.
- **No oiling of drive unit.** Sealed ball and roller bearings in central drive unit require *no lubrication.*
- **⅛" Impulse sealing.** Save on material with the new, improved impulse end seal. Wire cut-off makes clean, consistent ⅛″ end seals.
- **Fully-protected electrical controls.** Dust and waterproof panel houses all electrical controls, makes cleaning easier and faster, reduces maintenance.

EXCLUSIVE FEATURES

- **Completely new modern design.** Styled by Peter Muller-Munk Associates, foremost industrial designers.
- **Fastest drawbar action.** New linear, crank-operated drawbar, spring counterbalanced for longer life, speeds bag forming.
- **New paper feed.** Unique pre-feed roll arrangement eliminates drawbar pull and film stretching.
- **New plug-in end seal assembly.** The only machine to offer fast, easy change-over of sealing mechanism for different types of film.

All-new engineering, performance, and appearance make the Transwrap S-750 the most advanced bag forming, filling, and closing machine you can buy. The S-750 runs polyethylene and all other flexible, heat-sealable materials, is especially adaptable to pouch packaging of frozen vegetables and candy products. Get all the facts on how the Transwrap S-750 will help you increase your profits. Call your PACKAGE Sales Representative today.

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It's true that H & D has a reputation for solving thorny packaging problems with imaginative box design. But our real forte is *volume production of regular slotted corrugated boxes*—the kind you probably use to ship your product. In fact, H & D's annual output includes about 225,000,000 of these economical containers. Can you make use of this *specialty* for *volume?*

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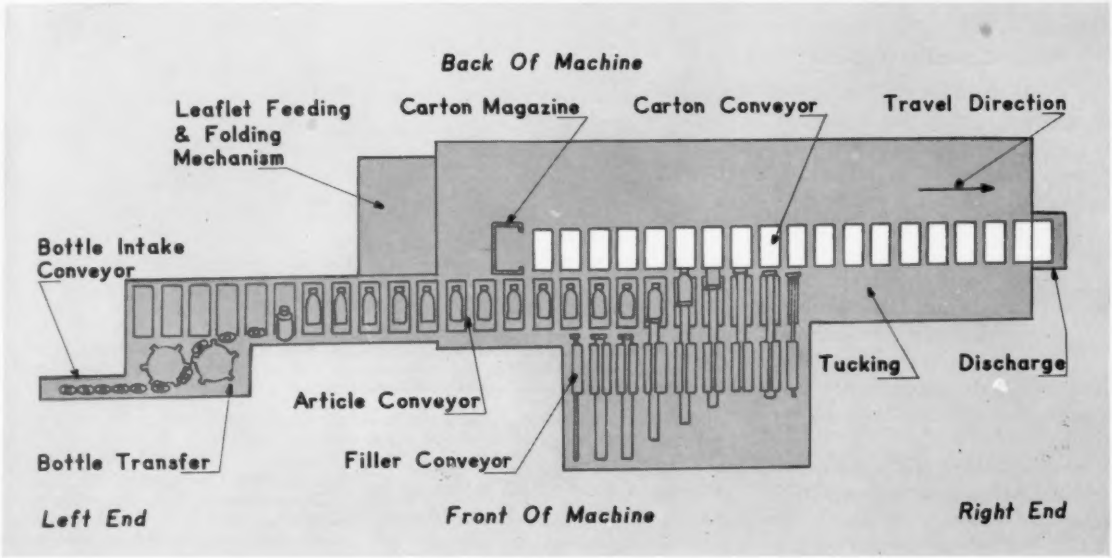
HINDE & DAUCH DIVISION, WEST VIRGINIA PULP AND PAPER, SANDUSKY, OHIO • 17 PLANTS • 42 SALES OFFICES



1 **FULLY AUTOMATIC CARTONER** handles bottles fed standing upright into machine, directly from labeler. Note principle components and travel direction; also, which is front, back, and so on—front is on side of filler conveyor. When you face front of machine, bottles and cartons move from left to right.

Understanding AUTOMATIC CARTONERS

By William F. Dent, *Manager, Sales Engineering,*
F. D. Redington Company, Bellwood, Illinois

Lack of exact rules to follow makes it difficult to explain to the uninitiated, practical carton ranges on automatic cartoners. Telling about some of their principles and limitations, Mr. Dent describes three types and lists what points should be considered before selecting a machine for a given operation. His discussion covers such things as: the use of lugs vs. pockets, limits on carton length, feeding of leaflets, among others.

When the mailman visits the plant of a cartoning machine manufacturer, he frequently brings a hopeful letter inquiring about a standard, fully automatic cartoner that must be adjustable from a carton containing a pen point to one containing a golf bag. Specifications will include minimum floor space, fastest possible changeover, and low initial cost. A postscript may also request that the machine be capable of handling both tuck-end and glue-end cartons. The next outgoing mail will probably include a letter which begins, "Thank you for your letter, but . . ."

No Guides To Follow

It is extremely hard to explain to those not thoroughly familiar with cartoning machinery just what is a realistic and practical range of cartons on an automatic machine. The difficulty stems from an apparent lack of precise rules to follow in determining such a range.

This article cannot possibly develop any hard and fast rules, but we hope that it contributes something to the understanding of the problems connected with the design and manufacture of highly adjustable cartoners. It may also

help you decide which of the three fully automatic cartoners to purchase: single-size, adjustable, or range machine.

Three Cartoner Types

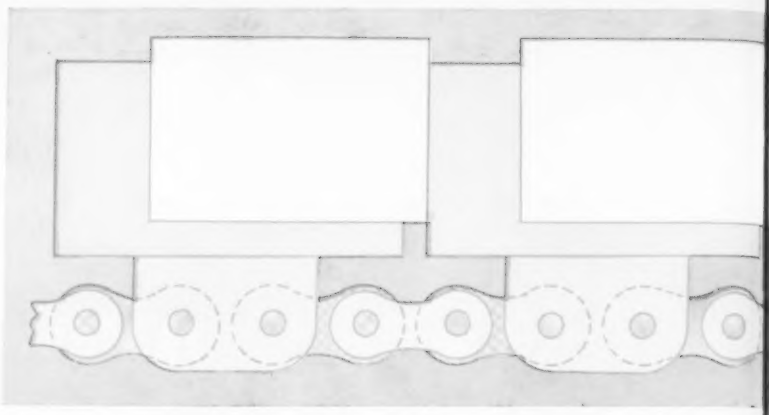
A single-size cartoning machine requires no further definition, but its features receive discussion elsewhere in the article. An adjustable cartoner means that it can handle a certain number of sizes. A range machine, too, is adjustable, but it can handle cartons larger and smaller than the ones it now does. In a sense, the adjustable machine is a range machine except that maximum and minimum size cartons handled are the limits of the range.

In approaching our problem we should first consider a basic, fully automatic cartoner as shown in Fig. 1. For discussion, we assume that the cartoning machine handles bottles fed standing upright into the machine, directly from a labeling machine. Fig. 1 shows the principal components and direction of travel through the machine.

Note Where "Front" Is

The front of a cartoning machine is on the side of the filler conveyor. The controls may occasionally be on the back of the machine, but when the manufacturer refers to the front, it will usually be on the side of the fillers. When you are facing the front of the machine, the bottles and cartons move from left to right. Once you are accustomed to this terminology, the parts list of a cartoning machine will not seem complete gibberish when you find a part listed as "Back L.H. Side Flap Folder."

Selection of the proper type of fully automatic cartoner depends on a few well-established basic considerations. First of all, we are assuming that the production volume is sufficiently high to warrant a fully automatic machine rather than a semi-automatic cartoner which sets up the carton, closes the bottom, and carries it through a manual loading area before the machine closes the top of the carton.



2A L-SHAPED POCKETS are used for carrying cartons through cartoner, and minimize chances of scuffing carton surface since carton rests on bottom of pocket; also, if "miss" (no carton) occurs, product enters pocket, machine continues, product drops into tote box.

How To Choose

To decide which of the three styles of automatic cartoner to select (single-size, adjustable, or range machine), you should consider the following points:

1. **Number of carton sizes** that you want to handle.
2. **Relative volume of each size.** You may have 15 sizes that you want to run on the machine, but a large percentage of your annual volume may be on only two or three sizes. Is the remaining volume of sufficient importance to include them on the machine?

To answer this you should consider where they fall within the sizes of the large volume items. Keep in mind that the adjustability of the machine should be within a reasonable limit. Let's not package your basketballs on your golf ball machine.

3. **Attachments.** Must you automatically feed chipboard platforms, droppers, applicators, sticks, leaflets, or corrugated protectors? If so, keep in mind that, while a highly adjustable cartoner can handle all of these items, the cost of the attachments is always less on a single-size machine. The greater the range of adjustability, the more complex become the problems encountered in handling multiple loads.
4. **Speed.** If the fastest machine in your line operates at 100 units/min., it would be pointless to purchase a cartoner capable of operating at 300 cartons/min. However, if your plans call for a new, high-speed line in the foreseeable future, it would be equally pointless to get a slow-speed cartoner.

High-speed cartoners can operate at lower speeds without any loss in efficiency, but be realistic when specifying the speed. If your 10-yr. plan calls for 200 units/min., specify this speed. You will then get a machine with sufficient speed for present and future speed requirements.

Cartoning Principles

At this point, let's take the guards off a cartoning machine and see how a single-size machine is built.

A single-size cartoner is designed and built for only one size package. Usually the parts are dowelled in place so there is no adjustment at all except for parts needing adjustment due to wear. The carton magazine, pockets on the product and carton conveyors, and tuckers are usually fixed.

The machine is built to handle normal variations in cartons and product, but, if you want to change

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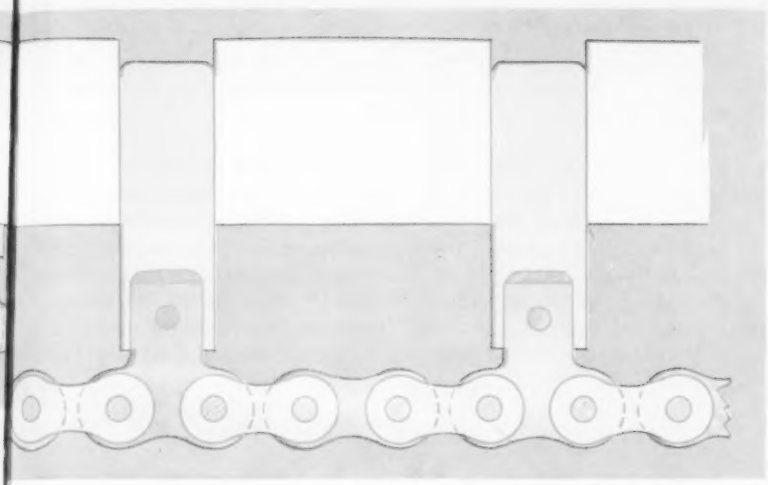


2B LUGS ALSO ARE USED to push cartons so they ride on polished rails. Theoretically, lugs provide unlimited range of carton length adjustment. However, they require "no carton" detector to stop machine if carton fails to feed for properly filled product pocket.

the dimensions of your package for some reason later on, the machine must be reworked.

Finding The Pitch

A cartoning machinery manufacturer's typical starting point with a particular machine is to determine its pitch – the distance from one point on a pocket to the corresponding point on the adjacent pocket. Because the carton is carried through the machine horizontally and the article loaded into the carton through the end panel, you can readily see that the *width* of the carton determines the pitch.

If the carton to be handled is 3 in. in width, the pitch must be greater than 3 in. because the pocket or lugs carrying the carton must have walls to hold the carton square. Normally, a chain with a 1-in. pitch is used to carry the product and carton pockets of a fully automatic cartoner. Because of this, the pitch is in even 1-in. increments. Thus, the pitch of a machine handling a 3-in. wide carton will be 4 in.

Increase The Width?

Because there is only one size carton to be handled, it would probably be carried in an L-shaped pocket or lugs as shown in Fig. 2. If it becomes necessary to increase the width of the 3-in. carton in the future, stock would have to be removed from the pockets. If the new carton were to be smaller, shims or spacers would have to be added to each pocket.

Now, suppose you want to increase your package size to handle a larger bottle or include another item with your bottle, for example, a dropper. Because the pitch of the machine is 4 in., you obviously cannot increase the width to 4 in.; you are limited to a new carton less than 4 in. Because the walls of the carton pocket must have sufficient width to carry the load, the maximum width for your new carton would be 3½ in., possibly 3¾ in., depending upon the construction of the carton pocket.

Changes Difficult

While it is possible to change the pitch of a cartoning machine, it would be a major rebuilding job, requiring replacement of almost all of the parts except perhaps the frame and drive mechanism. Sometimes the machine is changed to "skip a pitch," but this, too, is a major job. When skipping a pitch, the 4-in. pitch becomes an 8-in. pitch, but the operating speed is usually reduced in half. Skipping a pitch or changing the pitch of a cartoner is rarely done; usually the cost of the work is so high that a new machine is more practical and economical.

With a single-size cartoner, it may also be necessary to change the product conveyor pockets if we change the package size. This could be more difficult than the carton pockets – especially if the machine has a leaflet feeding and folding mechanism. The bottle transfer at the end of the product conveyor, the carton feeding mechanism, and the tuckers would also need changes to handle a new size.

Still Single Size

Thus, even though a cartoning machine is built for only one size package, it *can* be changed to handle a different size provided the new carton is within the pitch of the machine. It would not be an adjustable machine; it would still be a single-size unit, merely rebuilt for a new size.

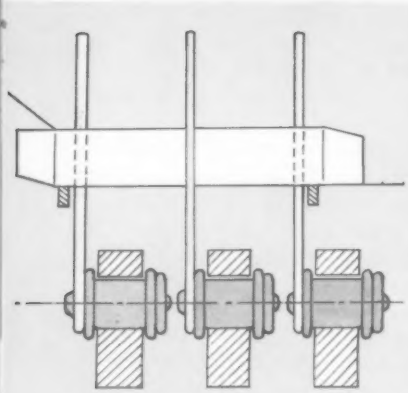
Despite its inflexible nature, a single-size cartoner has a definite place in some plants. To justify such a machine, you must have enough volume on that one size to keep the machine running at line speed during each shift. Not every plant has this ideal condition. Therefore, an adjustable cartoner becomes necessary.

Chains Make The Difference

The major difference between the construction of a single-size and an adjustable or range machine (other than adjustable parts within the machine) is the number of chains carrying the product and carton conveyor pockets. For a short carton, a single-size machine has only one chain, with each wall of the pocket fastened to the chain. If the carton is long, two chains carry the pocket, one at each end of the pocket, to provide stability.

A modern adjustable cartoner normally has two or three chains, sometimes even four. Considering an average length carton, say 6 in. long, there would be three chains.

(Turn page)



3A STRAIGHT LUGS WITH SHORTEST CARTON. Lugs are as close together as possible; so, this is shortest carton that can be run with lugs arranged in this manner.

The left-hand, or "pushing" wall, of the carton pocket is always fixed; the adjustment is to the right. The left-hand wall is carried on two chains, one at each end.

The right-hand, or "retaining," wall is carried on one chain. For very long cartons, the retaining wall may be carried on two chains. When adjusting the carton conveyor for width of carton, the center chain is moved, which adjusts all the right-hand walls simultaneously.

Lugs Or Pockets?

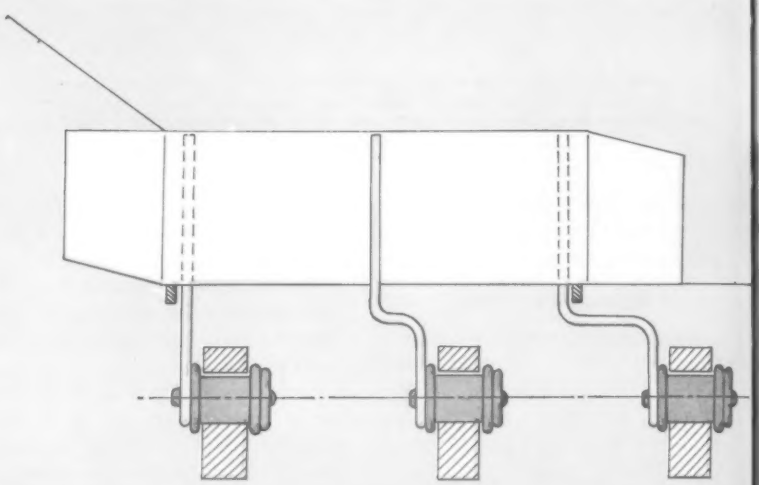
The same method of adjustment is used when the machine is equipped with carton conveyor lugs instead of pockets. In this case, there are three chains – the front and back chains carrying the pushing lugs and the center chain carrying the retaining lug. As you might expect, there are advantages and disadvantages to both types of conveyors.

Fully automatic adjustable cartoners normally have the front side fixed; adjustment for length of carton is made to the rear of the machine. Usually, when using carton pockets, the sprockets carrying the chains do not slide on their shafts. The carton pocket is designed for the shortest carton in the range – with the walls of the pocket slightly shorter than the carton because of tucking.

How Difficulty Arises

Let us say that our shortest carton is 2 in. long. The carton pocket would then be 1¾ in. long which allows the carton to extend ⅛ in. out from each end of the pocket. If our longest carton is, for example, 6 in. long, two-thirds of the carton would extend unsupported from the back of the pocket.

This would be excessive because the carton would tend to collapse and get out of square since it is unsupported for so much of its length. In addition, the back end of the carton would drag back while moving through the machine. Tucking would be extremely difficult, if not impossible, under these conditions.



3B OFFSET LUGS WITH LONG CARTON. Advantageous (Fig. 3C) over straight lugs, offset lugs can cause problems with glue-ends, as rear chain interferes with bottom panel.

You can overcome this problem by centralizing the carton pocket. This is done by moving the conveyor chains back on their shafts so the carton pocket grips the carton in the center. This would leave approximately 2 in. of the carton extending from each end of the pocket, and the carton would be under control for proper tucking.

Advantages Of Carton Pocket

There are two principal advantages of the carton pocket over the carton lug. With carton conveyor lugs, the carton rides on polished rails. With some types of carton board or printing, there is some chance of scuffing the carton as it is carried through the machine; but with the carton pocket, the carton rests on the bottom of the pocket, reducing these chances.

The second advantage of the pocket over the lug is when a "miss" occurs. Even though the modern carton-feeding mechanism is extremely efficient, it still misses occasionally. When this happens, the bottle or other article in the product conveyor pocket is transferred into the carton conveyor pocket by the filling mechanism and the machine will continue to run. As the carton pocket goes around the sprocket, the article will fall into a tote box.

Lugs Require "No Carton" Detector

If carton lugs are used, as the article is transferred from the article pocket, it would fall into the moving carton conveyor chains and probably cause a jam. It is therefore necessary to provide a "no carton" detector which will stop the machine if a carton fails to feed for a properly filled product pocket.

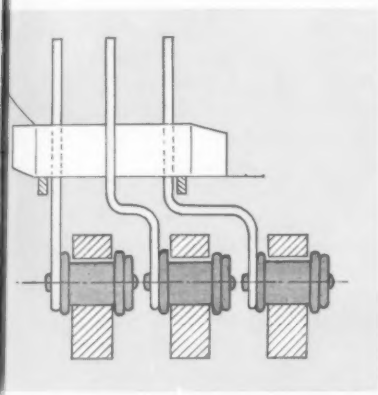
The operator must then remove

the article and restart the machine. Even though the carton feed rarely misses, some loss of efficiency does result.

Limits On Length

The range of length adjustment, when using carton pockets, is usually limited to approximately twice the length of the shortest carton. For increased length adjustment, carton conveyor lugs are used since they provide the utmost in flexibility for length adjustment. When adjusting for length of carton, the back chain carrying the back pushing lug is moved in or out.

Frequently, the center chain carrying the retaining lug is also moved to keep the lug near the center of the carton. Theoretically, the range of adjustment in length, when using lugs, is unlimited; so the manufacturer of golf bags may be in luck!



3C OFFSET LUGS WITH SHORTEST CARTON. Use of offset lugs allows handling of very short carton—shorter than with straight lugs, as is shown in Fig. 3A.

However, because of the width of the chains carrying the lugs, there is a definite minimum length of carton that can be handled. Thus, the golf bag manufacturer shouldn't insist on packaging tees on the same machine. In order to bring the lugs closer together, ¾-in. pitch chain can be used. This size chain is not as wide as the customary 1-in. pitch; so, a shorter carton can be handled.

By using offset lugs on the center and back chains, even shorter cartons can be handled, as illustrated in Fig. 3. The use of offset lugs, however, presents problems when glue-end cartons are handled, as the rear chain interferes with the bottom end panel and the glue box.

The product conveyor of an adjustable cartoner is also carried on two, three, or four chains depending on the length of the pocket. As with the carton conveyor, the left-hand wall is fixed; the right-hand wall is carried on one or two separate chains.

Want To Feed Leaflets?

There is one added complication, however, when the cartoner is equipped with a leaflet feeding and folding mechanism. Fig. 4 illustrates two common methods of carrying folded leaflets in pockets of the product conveyor.

Whether the leaflet is fed from a magazine or cut from a roll, it must still be folded and placed in the product pocket. Fig. 4A shows the folded leaflet placed in slots in the product pocket over the top of the bottle, with the ends of the leaflet extending down the sides of the bottle. Fig. 4B shows the folded leaflet inserted into a slot in the bottom of the pocket and folded up and over the bottle.

Effect On Adjustment

Addition of a leaflet mechanism to an adjustable cartoner can result in certain problems depending on the range of cartons the machine handles. Changing the carton in any, or all, dimensions could affect the leaflet. The length of the folded leaflet should not exceed *twice the length* of the smallest bottle (or other article) *plus the width* of the bottle for the method in Fig. 4A, and *twice the length* of the smallest bottle *plus the thickness* for the method in Fig. 4B.

When handling the largest bottle, both methods require that the leaflet have sufficient "wrap-around" for proper control of the leaflet during the filling operation. Generally, the *minimum* acceptable wrap-around is *one-third the length* of the bottle.

Limits On Leaflet Size

Size of the final fold of the leaflet is important with both methods. The width of the folded leaflet obviously cannot exceed the inside dimension of the carton. The machine could certainly force a wide leaflet into a narrow carton, but quality control men seem to prefer a neat, sharply folded leaflet to a wad of dog-eared paper.

If the leaflet is folded rather narrowly, some difficulty may be encountered if the cap of the bottle is small compared to the bottle diameter, as the leaflet tends to ride off a small cap while being filled into the carton. Generally, the bigger the cap the better the job. However, if the cap has a larger diameter than the bottle, it is difficult to control the bottles since they are brought into the machine standing upright on the intake conveyor.

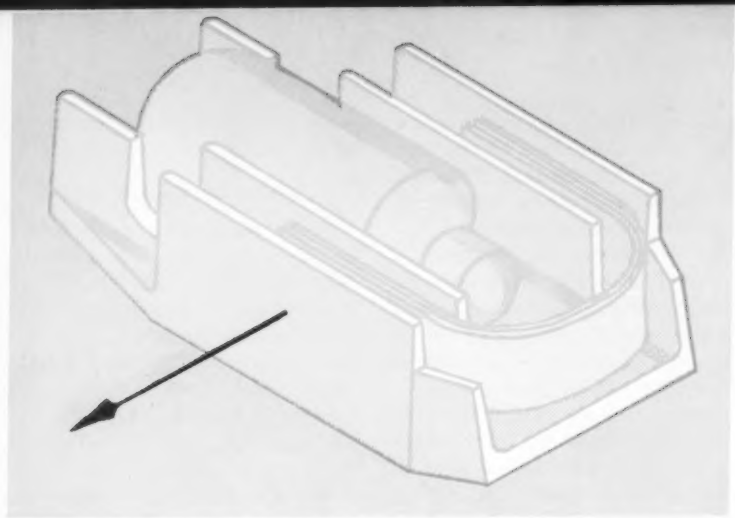
An adjustable leaflet mechanism, to a large extent, reduces or eliminates the problems mentioned above. However, an adjustable leaflet feed is usually more expensive and is just one more mechanism to adjust when changing sizes.

Source Of Trouble

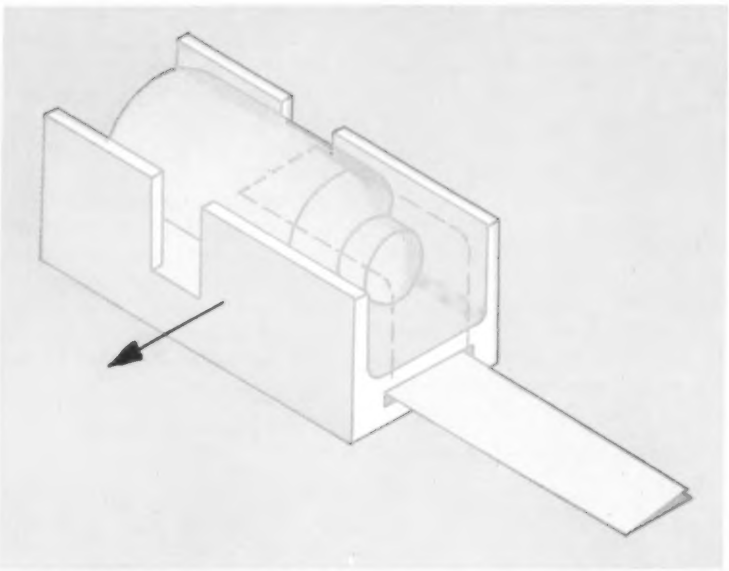
Are there inefficiencies on a highly adjustable cartoner that are not present on a single-size machine? Definitely not! A modern adjustable cartoner, when properly set on the marks, should run just as efficiently as a non-adjustable unit. Where there is trouble, it usually turns out that someone did not make an adjustment, or did not do it correctly.

Probably the most frequent cry heard around a cartoning machine is "bad tucks." Sometimes this trouble traces back to an incorrect setting in the carton feed, but in most cases it will be in the tuckers.

Tucking on a high-speed cartoner occurs in a number of positions. The tuckers themselves are carried on a bar which is, in turn,



4A FOLDED LEAFLET PLACED IN SLOTS in product pocket, with ends of leaflet extending down sides of bottle, is one method of carrying leaflets into cartons. With this method, folded leaflet length should not exceed *twice length* of smallest size bottle *plus width* of bottle.



4B LEAFLET INSERTED IN SLOT in bottom of product pocket, and folded up and over bottle, is another method of carrying leaflet into cartons. When this method is in use, length of folded leaflet should not exceed *twice length plus thickness* of smallest size bottle.

mounted on a parallel crank mechanism. The speed of the cranks is such that it approximates the linear speed of the carton conveyor.

Need Square Cartons

Usually, the first tucking position is the slitters which are spring-steel pieces arranged to enter the carton to assure proper opening for entry of the tuck flap. When the long, "manufactured" seam of the carton is glued slightly out of square, the corner of the carton at the glue seam closes up at one end and opens up at the other. The slitter enters the carton and slits the carton to provide the proper opening for receiving the tuck flap.

The second position is the breaking of the tuck flap along the score line. This is done against a "breaker form" which is set to line up with the score line. On highly adjustable machines, the breaker form is a very precise part, carefully designed and manufactured.

How Flap Folder Works

At high speeds, and even at low speeds, it is desirable to design the flap folder leading into the breaker form so that the end panel of the carton is supported over as much of its surface as possible. The flap folder spirals the flap up from the horizontal. This folder is designed so that the end panel cannot bow as it is guided up.

The length of the tuck fold is important, as the angle assumed by the end panel at the breaking position is determined by the thickness of the carton and the length of the tuck flap. This angle should not exceed 45°. If the tuck flap is too long, the angle becomes too flat and tucking is difficult.

Fig. 5 shows the first, second, and third tucking positions. The first tucker pushes the tuck flap approximately ¾ in. into the carton, as the tuck flap is controlled on the bottom by the breaker form and on the top by the aligner.

The second tucker can be adjusted to push the tuck flap in either straight or at an angle – in order to rock it into place. If it rocks the flap into the carton, an auxiliary position serves to square the flap.

The third, or final, tucker has "buttons" and is used with lock-slit cartons. The buttons force the end panel in beyond the end of the carton, causing the lock slits to lock on the side flaps.

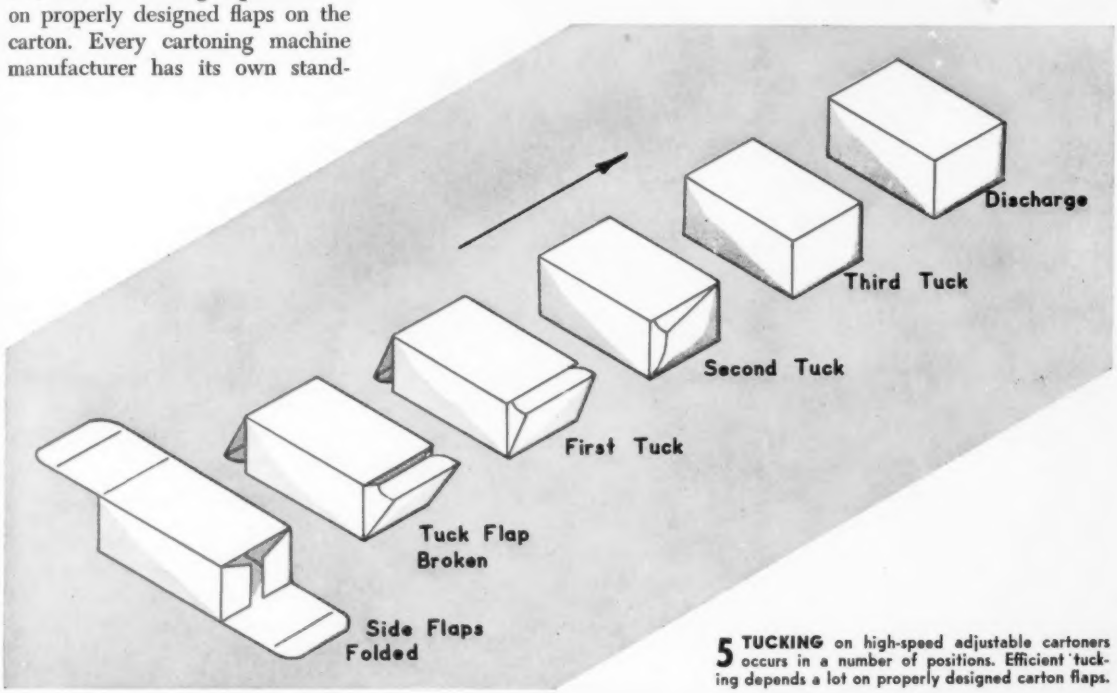
Tucking Details

On adjustable machines, the tucker parts are sufficiently wide for the widest carton to be handled, but they also work with narrower cartons. The right-hand slitter and the right-hand button on the third tucker are adjusted for carton width.

On an adjustable machine designed to handle two or three sizes,

there are frequently flap folders and breaker forms for each size. Thus, when adding another size, you may have to purchase new parts. A true range machine has flap folders and breakers completely adjustable for the entire range of cartons.

Although the tuckers of a highly adjustable cartoner are very flexible, efficient tucking depends a lot on properly designed flaps on the carton. Every cartoning machine manufacturer has its own standards, but these are strikingly similar. Because tucking plays such an important part in the quality of the finished package, the user of the machine should follow the manufacturer's recommendations when ordering cartons.



5 TUCKING on high-speed adjustable cartoners occurs in a number of positions. Efficient tucking depends a lot on properly designed carton flaps.

The Range Cartoner

After development of the adjustable, fully automatic cartoner, the next step was the range machine, universally adjustable for any number of sizes within the range. For a number of years, true range cartoners have been limited to semiautomatic vertical machines. In these, the operators load the product directly into the cartons moving through the machine, standing upright.

The highly adjustable features of the vertical machine are now being applied to fully automatic, horizontal machines. With the advantages of the horizontal cartoner, speed, and automatic loading of the product into the carton, they will undoubtedly become of greater and greater importance.

Because the range of the cartoner will be extensive, it should not be necessary to design a special cartoner to meet normal requirements. This will mean quicker delivery and lower price for a modern, high-speed, fully automatic cartoning machine.

Basis For Decision

It is extremely difficult, if not impossible, to list inflexible rules to follow when deciding upon a type of cartoning machine. As a partial guide, we suggest the following points:

Single-size, single-purpose cartoner:

1. While the machine will handle only one size package, it can be rebuilt for a new size if the new size falls within the pitch of the machine.
2. Lowest cost, fully automatic cartoning machine.
3. Easiest machine to equip with various special attachments.
4. Very high efficiency in production because of being permanently fixed on one size.

Adjustable Cartoner:

1. Factory set and tested on required sizes. Additional sizes can be added as required provided the new sizes fall within the limits of the present sizes.
2. Can be equipped with various special attachments, but adjustable features of the machine may present some complications.
3. Efficiency should be just as high as a single-size machine provided adjustments are made correctly.

Range Cartoner:

1. Ideal machine when the utmost in future flexibility is desired beyond the present sizes.
2. Can be equipped with various special attachments, but, because of the complete adjustment within the range, complications may be encountered.
3. Should operate as efficiently as a single-size machine provided all adjustments are made correctly.
4. At present is probably more expensive than an adjustable machine with a finite number of sizes, but, as development continues, price should approach that of the normal adjustable machine. *(End)*

Louis T. Brannon has been with Westclox for 23 years. During this long association, he has been connected with time study, methods work and other related industrial engineering functions. Mr. Brannon completed the summer management course at the University of Iowa and took his Methods Time Measurement training course at the Serge A. Birn Co. He is a member of the Peoria Chapter of the American Institute of Industrial Engineers.

Balancing packages methods and line operations to get cost savings

By Louis T. Brannon,
Equipment Engineer,
Westclox Division,
General Time Corporation,
LaSalle, Illinois

As much as each specialist can make his own contribution to packaging economy, the final arbiter usually is the package itself and the packaging operation through which it moves. Mr. Brannon stresses the importance of taking materials and specifications, packaging line methods and equipment — and balancing them with each other. He looks at the standard motions of the MTM system and shows how these contribute to the balancing of loads among individual operators on packaging lines. He warns against considering any of these elements separately, pointing out that economy in one may be at the expense of another — thus raising the total package cost.

No packaging expert can attain cost savings by his efforts alone. Rather he must coordinate his work with that of other specialists in his plant with the result that they all contribute to cost reduction. Whether you are reviewing existing packages to extract previously unrealized savings, or are setting up a package for a new product, the effect is the same.

Peak packaging efficiency, with a plant operation such as ours, depends on close coordination of packaging materials and methods, package specifications, packaging line techniques and equipment — and a thorough mixing and balancing of all these. We use the MTM system of pre-determined time values for basic motions as a key feature of our packaging methods development. With it we can balance the different assignments of individuals on our various packaging lines to get economies. Without this breaking down of operations into components, we might not otherwise attain these economies.

Creating The Package

Typical start of a packaging project is development of a package for some new product. Our packaging engineer initially selects the packaging materials and works up a package, say, consisting of inserts, boxes and cartons — as the product and its shipping quantities may require. At this point he concentrates only on getting what, in his judgment, is the best package for this product and its particular structural and functional problems.

We find it most helpful to make our own original samples rather than to ask our suppliers to do so. After we have developed and tried our own, we then may ask our suppliers to see what they can give us, and then test their specimens. Normally our packaging engineer test ships his new packages just as soon as he develops samples. We find that one round trip from LaSalle to the Chicago post office is an adequate sample of the rigors of parcel post handling.

After our packaging engineer completes and tests his package,

our purchasing people normally contact suppliers to see if they can produce this package as we envision it. There must be close cooperation between our experts and those of our suppliers because, for example, they may not be able to produce economically the package our engineer considers ideal for a particular product. As a result, there is a certain amount of compromising.

Set Up Line Methods

Assuming that we and our suppliers agree on the probable package for this new product, the next phase is development of appropriate methods. Because of the variation of products themselves, as well as length of runs, we use much manual packaging to supplement the equipment and machinery on our lines. This places great importance on a correct approach to time and motion in order to evolve the most efficient packaging methods for a given product and its package.

Here we may find that the best package from a structural and functional point of view may not be the best on our production line. In applying their skills to the protection of our product, our packaging engineers may have devised some carton tucks or folds that simply cannot be handled on a packaging line. Similarly, economies inherent in using certain manual methods may justify a more costly package from the standpoint of structure and materials. **We emphasize that the controlling factor is neither the package nor the labor cost, but the total cost of both.**

Using The MTM System

Essence of our time and motion work is that we use the MTM (Methods Time Measurement) system of predetermined time values. The MTM system involves an organized body of information, procedures and techniques used in studying and evaluating work elements done by human power. This is a procedure which analyzes a manual operation or method into

1 REACH BY WORKER typifies use of Methods Time Measurement system — all involving predetermined time values. Even highly specialized packaging tasks are broken down into standard motions.

2 VERY LITTLE MACHINERY finds its way onto these packaging lines because variety of production and length of run demands flexibility. Aids such as conveyor belts supplement manual methods.

3 STACK OF PACKAGING components shows typical structure design features. Package designers and methods engineers compromise difficulties in order to get smooth flowing, efficient operation.

4 DEPENDENCE OF MACHINERY on correctly made packaging materials stresses importance of balancing an operation. Balancing dictates gearing production flow from manual workers to machines. Centralized packaging permits use of across-board standards.

5 PRODUCTION SHORT-CUT developed by plant specialists uses air cylinder and foot pedal action to deliver cases tipped at angle for convenient loading. Similar device straightens them for transfer to conveyor leading to sealing station. Tipping aids loading.

the basic motions required to perform it. It then assigns to each motion a pre-determined time standard which is determined by the nature of the motion and the conditions under which it is made.

In a nutshell, the system consists of a number of standard moves and motions. Among these are reach, move, turn, crank, apply pressure, grasp and release, position and disengage, eye time and body motion, and motion combinations. All this is part of a basic system used in many processing, manufacturing, and other industrial activities. What you do is break the operation (whatever it is) down into standard motions. For example, as applied to our packaging techniques, each of our packaging tasks has been broken into its combination of these standard motions.

Another important feature is that these standard motions also involve standard time values. Experts in the MTM system usually speak of these as standard TMU's (time measurement unit) which are 36/1000 of a minute.

No Individual Errors

One of the reasons this system is widely accepted throughout industry is that it eliminates the vagaries of individual judgment. Rather it is a matter of taking these standard moves, working up various combinations of them and adding the total. It is all pre-determined in the terms of these values, but the important job is to correctly distinguish the moves, reaches, grasps and so on. They are based on nationally used standards.

Further, the time assigned to each motion does not depend on the operator. Rather it is worked out in terms of the average operator as found in a universally varying distribution. Thus the element of judgment, of performance required by a time-study analyst, and the times established therefore are fully objective.

Go Easy In Applying These

Beneficial as this system is, we urge caution in its application. Our experience has been that not only the study of its basic literature but also a training course is necessary to make it effective. There are various firms and individuals qualified to conduct the courses as approved by the MTM association, and we urge anyone interested to make use of them.

At first glance, it appears that the system does away with stop-watch timing. For many practical purposes, this is the case. However, under some conditions, stop-watch timing and time- and motion-study

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For more information circle No. 231 on Reader Service Card, Page 117

may work hand in hand with the MTM system. We cannot generalize other than to suggest that one of these or any combination of them may fit in with the MTM system in a particular application.

Taking our new package and developing a set of motions, we arrive at time values in accord with the system. We then convert these to dollars in accord with our piecework system and get an overall cost of labor and material. But there is more to the system than simply the application of maximum economy of individual motion in using packaging materials. A more serious problem is the balancing of packaging line performance.

Matching Of Capacities

A usual starting point is to take one package, our new product, and determine how many packages one girl can handle per day. Next job is to ascertain how many girls are necessary to package the desired production quantity. Now we have the difficulty of balancing operation. For example, one girl may be able to handle 1,200 units, but for that particular operation, the quantity of 2,000 is the controlling factor. This means that, if one girl can handle just 1,200, two girls can handle 2,400, thus 400 in excess of the 2,000 figure. As a result, we are not getting peak performance because of our inability to use the total potential output of the two girls.

There is always one job on a packaging line that is controlling. It paces the line. To take another example with a hypothetical figure of 2,000 clocks: Ten girls may be necessary to do the packing. After this, the job may involve putting the clock into the carton at the machine. We may find again that 1,200 is our maximum individual production and it thus takes two girls to handle the production of 2,000. Theoretically, we require "one-plus" operators so we have to use two.

Here is where the time and motion concepts and the standard values come into play. A certain job may include 15 sec. to inspect a clock, 10 sec. to package it in the insert, 5 sec. to put it into the cartoner, and so on. By means of this breakdown, we find out how many operators we need to balance our line. The trouble is that the values do not coincide with each other. For example, instead of quantities of 15, 10, and 5 sec., the sequence of motions may be 17, 8, and 5 sec., respectively. This, in turn, means the operators do not have equal workloads.

Balancing The Load

The ideal solution now is to take away 2 sec. from the first job, and add that 2 sec. to the second task. This is done by breaking the job into components and then transferring some of the components from one work station to another.

However, this is more likely to be effective in the packaging of small items, such as watches, than in clocks which are relatively large. This is because there are more motions and actions involved, and thus more opportunities for transferring from one to another in the case of watches than in the case of clocks.

But the point is that you break the jobs down into the number of seconds per component task and then shift the component tasks from individual to individual in order to balance out as closely as possible the total aggregate production — to equalize the workloads. Usually we are forced to operate with less than theoretical efficiency of all stations 100 per cent loaded.

Seek Better Methods

Just as in the case of structural and functional package development, the development of standard packaging motions cannot be considered alone. Similarly, results of test shipments may start coming in indicating a need for change. As suggested earlier, your time and motion people may tell you that some phase of the package construction is "killing" the job. As a result, the package designer or engineer has to overcome the difficulty with regard to standard motions. The need may be for a faster and simpler way to close the carton, thus modifying the ideal package because of too many motions being involved in doing it according to this ideal package's specifications.

We never overlook any suggestions the production foremen may make. Since they are the ones who supervise the actual handling and filling of these packages on the line, their experience is worth noting. Often major savings result from a foreman's suggestion — for example, involving as simple a thing as providing a slit for a clock key. Thus, again we have a balancing process: The structural and functional design of the package as evolved by the packaging engineer, the combination of standard motions as evolved by our time-study people, and the practical refinements suggested by our foremen.

Watch Your Materials

In a closely coordinated situation of this type, packaging material variation can be a serious problem. In working out the time and motion, we allow for a small predetermined amount of defective material. If this becomes relatively high, we have to do something about it. We try to hold the deviation to 2 to 3 per cent. If it runs way up, say, toward 15 or 20 per cent, we necessarily take it up with the supplier.

A typical problem arises like this: A manufacturer may provide kraft rather than jute board in a carton. Kraft has greater spring because of its fiber characteristics and this means it is harder for our operators to bend it. As a result, it slows down their work and induces fatigue more quickly. This sort of thing has led us to tighten up our specifications and to insist that these specifications be carried out.

When packaging material is defective, we may do nothing more than add another operator in order to get the job out without impairing production. Sometimes it happens that our supplier concedes error of one kind or another, say-

ing, in effect, "Go ahead and put an additional operator on the line to get the job done and we will stand the cost." In other words, the manufacturer does not want the defective packages or cartons sent back to him, but is willing to absorb the added cost of our having to *make* them work in our plant.

Look At Product Itself

Never overlook the possibility of making changes in the product itself. Sometimes the changing of a product's structural feature affects the packaging operation. We may find, for instance, that the inner construction of a clock is breaking its plastic dials. As a result, we have to devise a substitute package. This costs more and upsets our packaging efficiency and economy. As a result, we may work out a change in the product itself to cut this damage. In the interim, we devise some sort of temporary or substitute package until more economical features of product design can be applied.

By no means should these efforts to bring about packaging economy and efficiency be confined to new items. As with other companies, we are constantly evaluating our existing methods. We may review an entire packaging operation or an entire manufacturing sequence – always looking for cost reductions. This is necessary to remain competitive. It is as simple as that.

Centralize, Apply Standards

We have found it advantageous to centralize our packaging. Before the integration of the present system, every department of the plant had its own packaging operation. Now, not only are all operations according to *standards*, but they are *centrally controlled*. Assuming the time-study is correctly done, our operators should be able to do their respective jobs in the allotted standard times.

Obviously these standards carry implications far beyond just packaging. Among advantages for the MTM system are: (1) a uniform method of establishing standards for manual work, (2) reduced operator training time, (3) developing better methods more quickly, (4) improvement of training, (5) accurate figures for cost estimating, (6) improvement of plant layout, (7) helping the setting up and balancing of assembly (and hence, packaging) lines, (9) improved labor relations, (10) adequate and detailed methods records which are uniformly understood.

But you cannot expect a system to do it all. It is necessary to be sure that the standard motions are accurately applied and that the analysis within your own plant is correctly done. Similarly, it is important to relate carefully the methods and equipment used. We use a variety of packaging machinery on our lines. These as well as plant-devised shortcuts enhance our overall packaging operation.

Mechanical Shortcuts

For example, a case-packing device of our own development uses an air cylinder and foot-pedal action to deliver cases at an angle for convenient loading. A similar action permits straightening the cases so that they may be readily rolled to the conveyor carrying them to the sealing operation. Another device involves a scale equipped with a series of roller conveyor rolls on it. The attendant rolls each case onto the scale and checks it for weight. Although serving as an indication of shipping weight, it also gives us a check against a clock being left out. Most of our items are sufficiently heavy that, if one is left out of a case, it will be readily apparent on the scale.

Another type of production shortcut used to enhance our manual packaging work is a transfer system of powered rollers. These run at speeds considerably faster than the principal conveyor belt. There is a junction where the conveyor leading from the main packaging area meets a conveyor leading to the cartoning equipment. We found we were having a lot of jamming before installing an intermediate device. Between two short dead plates, we have a bank of powered rollers. These speed up each carton in such a way that, in effect, it receives a kick. Thus, it enters the infeed conveyor of the cartoning equipment without difficulty and without danger of jamming succeeding cartons. *(End)*

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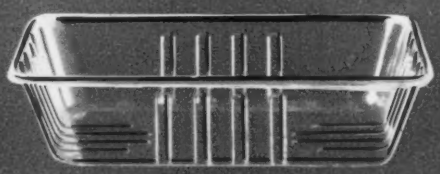

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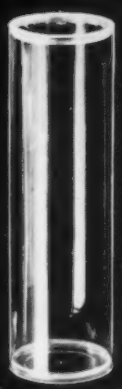

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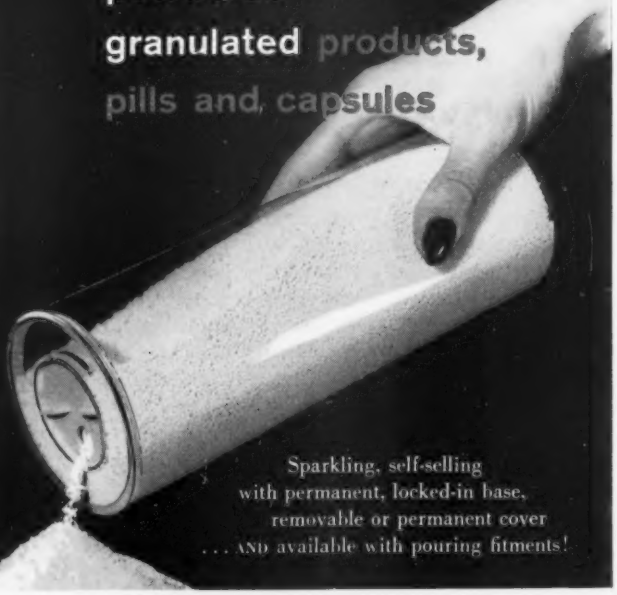

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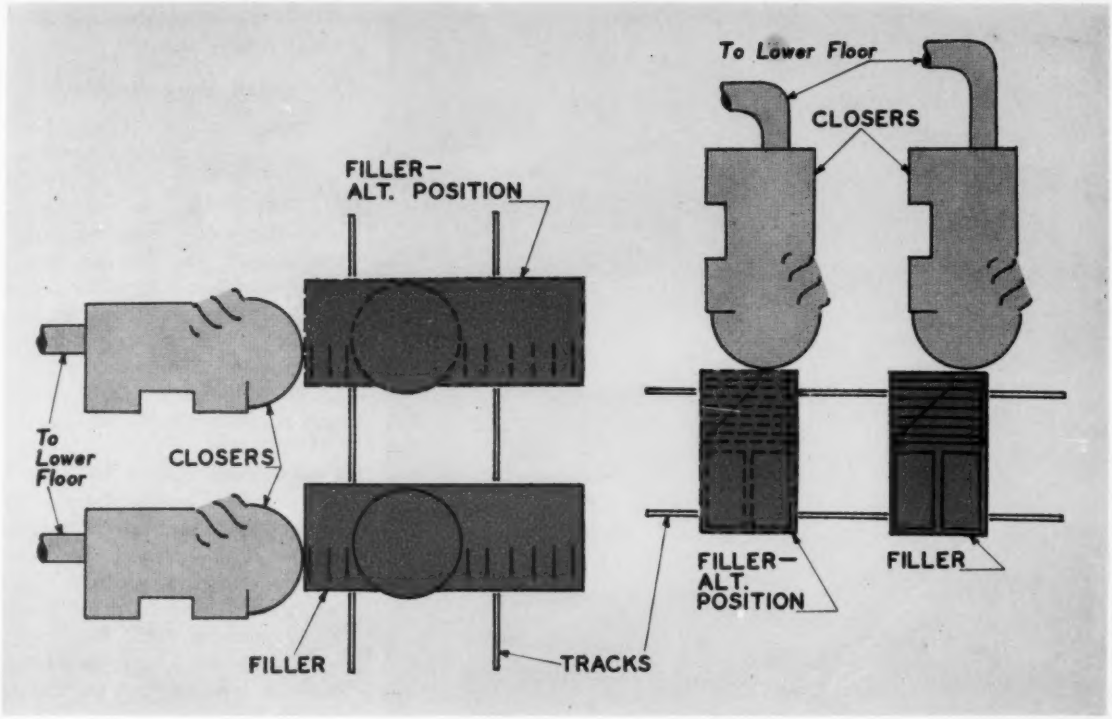


1 **VERSATILE CAN FILLING LINE** is laid out using fillers on tracks, allowing one filler to feed either of two closers each of which is set for different can sizes.

FILLERS ON RAILS add flexibility, save floor space

Cut equipment investment in half, allow more production time, facilitate maintenance, hold downtime to minimum, enable fast, efficient filling.

By F. D. Rubin, *Plant Manager, Chocolate Products Company, Chicago*

Our original layout consisted of a standard P.D.S. No. 10 closing machine and a twin-head motorized Crandall filler. With increased demand for No. 10 size capacity and introduction of a 46-oz. (404x 700) container, we faced the necessity of installing an additional closing machine and filler.

We added a Panama closing machine set for a 46-oz. size can and equipped the Crandall filler with 2-in. steel casters. This made it possible to remove the filler, when not in use, to any available space in the plant for temporary storage and roll it to the proper size closing machine when needed.

We found it difficult, however, to attain the exact position of the filler in relation to the closing machines. The situation became more complicated when the decision was made to fill four different size cans. Installation of conveying equipment was suggested, but this would require still more space.

To compensate for our extremely limited floor space, we installed a flexible and versatile filling and closing line for our canned products. **We attained the desired flexibility by simply adding casters to our fillers and installing tracks on the plant floor to permit easy and exact positioning of the fillers be-**

2 FILLER WITH CASTERS rides on tracks (arrow) and is easily moved from one closer to another, by one person in about 2 min.—including changing one section of stainless pipe.

tween the two closing machines. (See Figs. 1 and 2.)

The tracks consist of two strips of 4-in. wide channel iron bolted to the concrete floor. A ¾-in. angle iron was then welded to each strip of channel iron acting as a guide during movement of the fillers between the two closing machines. The rails were shimmed where necessary to compensate for the floor pitch. All of this greatly contributed to the economical use of floor space as no space-consuming conveyors were necessary to move filled cans between fillers and closing machines.

Benefits Of Rail Installation

In this installation, **we placed the filler and both closing machines at the same level,** which allows movement of cans directly from the filler onto the can feed disc of the closing machine. (See Fig. 3.)

With the filler on rails, one person can easily move it between the closing machines. There is no need to find a place elsewhere in the plant to store the filler after we finish a production run. It simplifies our work as we merely move it back and forth between closing machines and leave it there when not in use—thereby saving additional storage space.

Install More Machines

Upon developing a hot chocolate syrup to replace a powdered mix, a new 28-oz. size can (401 x 411) was added to our line to meet the special requirements of this market. We then installed a two-spout Elgin piston filler and an additional Panama closing machine to take care of our new production requirements. Shortly thereafter we added still another and smaller size can to our line – an 8-oz. can (211 x 304).

Experience gained by making our first filler mobile through the use of casters and rails was again applied in this instance. We welded 2-in. steel casters to steel plates and then welded the plates to the filling machine itself. Here again we found this simple innovation made it possible for one filler to handle two sizes of cans. The result of all this is that we now fill and close four different sizes of cans (211 x 304, 301 x 411, 404 x 700, 603 x 700) with just two fillers.

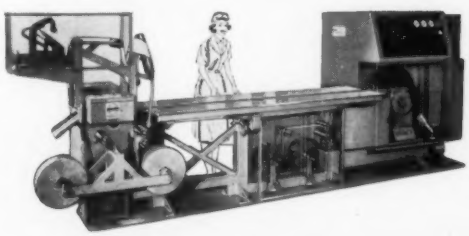
Details Of Operation

Our filling line crew manually loads the cans into a filling unit where each can is filled and moves directly onto the can feed disc of each closing machine, then into a drum feed. The drum feed positions each can properly for closing. (See Fig. 3.) After closing, the cans roll through a rinser, cooler, labeler, and are automatically cased.

A stainless steel sanitary piping system contributes to our plant flexibility. We can relocate a filler simply by changing one section of pipe. It takes one man about 2 min. to do this. Changing the piston stroke on the Elgin filler or changing the counter scale weights on the Crandall filler when making the changeover to different size cans takes one man approximately 10 min. The twin-head Crandall filler averages 800 cans/hr. Our Elgin two-spout piston filler averages 2,400 cans/hr. *(Turn page)*

Fred D. Rubin is a graduate of Illinois Institute of Technology with a B. S. degree in chemistry. Associated with Chocolate Products Company for 25 years, he started in the laboratory, advanced to have charge of research and development and subsequently became plant manager. Mr. Rubin is a member of the American Chemical Society, Dairy Technology Society, Candy Technology Society, and Institute of Food Technologists.

for better blister packaging



...the improved model 58 Sundstrand-Packmaster

Here is a machine designed to give you superior blister packaging faster and at lower cost than ever before.

A centralized remote electric control console provides rapid, easy operation of all machine functions. Provision for standby film and paper rolls minimizes shutdowns — when one roll is used up, the standby is easily spliced to it so that operation can be resumed immediately without rethreading the machine. Water-cooled plastic web guides insure flat, accurate edges on the blisters. Transparent enclosures exclude dirt and dust from the oven and sealing assemblies.

Complete change-over takes as little as five minutes. Forming dies are incorporated into a complete drum assembly which is rolled up to the machine, located on two dowels, and quickly fastened in place by hand screws. These factory-assembled die units specifically designed for each size or shape of package assure perfectly formed, crystal-clear blisters every time.

The improved Model 58 Packmaster uses butyrate or acetate film to form blisters up to 6″ x 6″ x 1¾″ in regular or irregular shapes. Machine speed, depending upon the package, can be varied up to 300 inches per minute.

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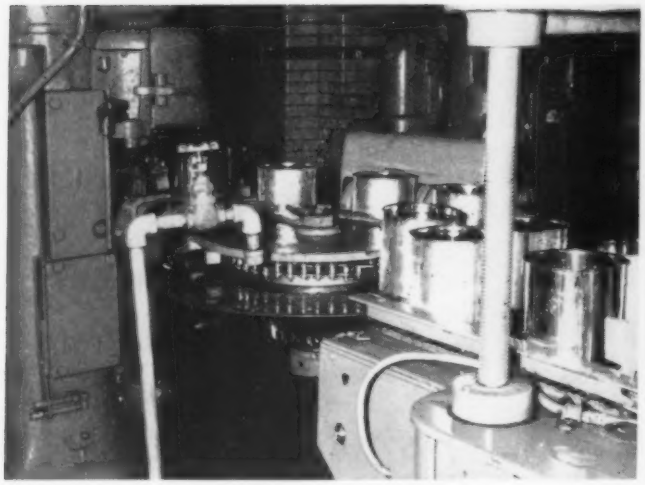

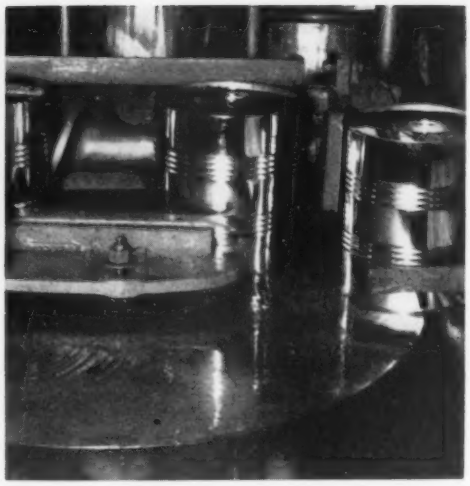

3 NO SPACE-CONSUMING CONVEYORS are needed to carry filled cans from filler to closer, since, with filler installed at same level as closer, filler discharges cans directly to feed disc of closing machine (left photo). Drum feed (right photo) positions cans properly for closing operation.

Benefits Of System

A number of advantages were gained as a result of putting our fillers on tracks:

1. **Our investment in filling** equipment alone was cut in half.

2. **We cut the use of our floor space** to a minimum because there is no need for wide aisles in which to move equipment.

3. **Space** (formerly set aside for the storage of our fillers) **now serves us to better advantage** for the storage of packaging materials.

4. **We get more production time** with each filler because it now

(Continued on Page 124)

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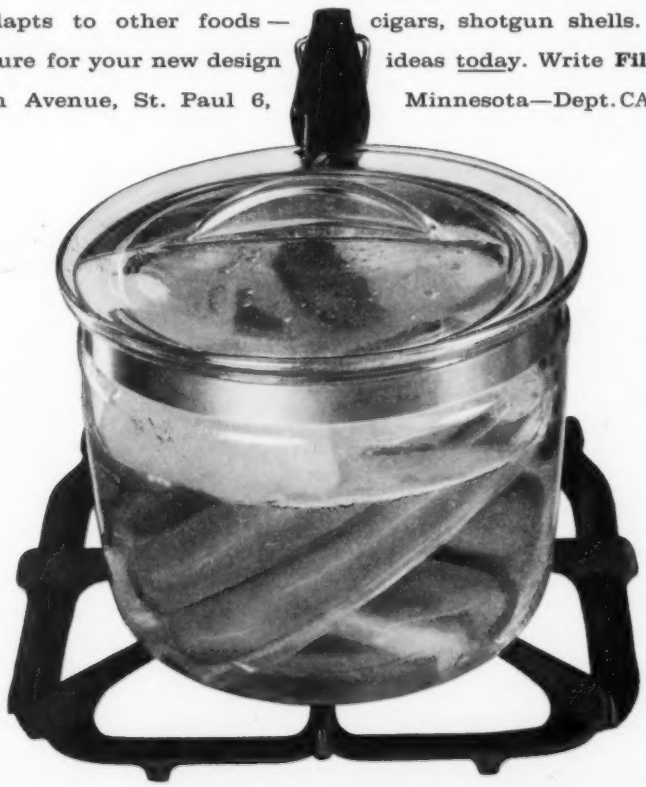

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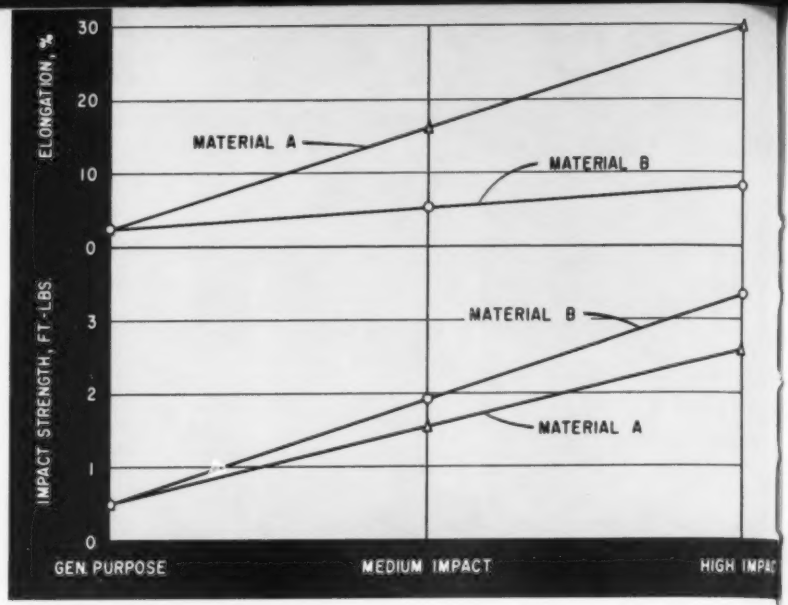


1 ELONGATION AND IMPACT STRENGTH of three types of polystyrene. Practical toughness of polystyrene, as measured by combination of impact strength and elongation, shows A better than B since A's elongation increase more than offsets its slightly lower strength.

Match polystyrene properties / threaded closur perfo

By J. W. Mighton and R. E. Pfister,
Molding Section, Plastics Technical Service,
The Dow Chemical Company, Midland, Michig

Injection molded thermoplastic threaded closures offer structural and functional design flexibility, allowing packaging engineers and designers to think in terms of improved shapes as well as effects with a wide range of colors. Thermoplastic closures are a necessary component of the upgraded packages of today.

Polystyrene meets the performance requirements made of threaded closures. Selection of a particular polystyrene for a given closure application, however, will depend on what material is best suited for the application as determined by such factors as cost, availability, processability, and specific physical properties of the resin. This discussion of the polystyrenes, their properties and design, also helps to provide the basic design considerations for all thermoplastic threaded closures.

Choosing A Polystyrene

Polystyrene molding resins are available from a number of plastics producers. The many different commercial resins are loosely grouped into three all-inclusive categories: "general purpose," "medium impact," and "high impact."

To determine which type of polystyrene is best suited to answer the property requirements of a single closure application, the designer or packaging engineer must be able to relate the several types to the properties which are most important in his closure design.

PROPERTIES

Toughness and rigidity are important strength properties to consider when selecting a thermoplastic material for threaded closures.

Toughness

Plastic closures must have adequate inherent toughness to prevent breakage from the torque encountered when capping a bottle. The amount of toughness needed depends upon the size and design of the closure.

The term "toughness" as such is not well defined and is, therefore, difficult to measure. One measurement often used is impact strength. However, when you think of toughness as the ability to "take it," you must also consider elongation values, or the ability to deform under load.

Again, we lack a good definition of the relationship between impact values and elongation values in regard to practical toughness. A mathematical formula is not available. Therefore, the best approach is to compare both impact strength and elongation, and choose that material which gives the best combination of both properties.

As seen in Fig. 1, impact and elongation values increase from a general-purpose polystyrene to a high-impact polystyrene. The graph shows impact and elongation values for two different polymers. Using only impact values as a guide, Polymer B would be the choice rather than A.

However, if we consider elongation as well as impact strength for practical toughness, Polymer A ordinarily would be better than B. Polymer A's improved elongation would more than offset its slightly lower impact strength.

Rigidity

In addition to toughness, a material must have adequate rigidity. A material could have a very high degree of toughness and yet be so soft that it would override the

Threaded closure performance depends a great deal on having the proper physical design and the right combination of the plastic's functional properties. Discussing such properties as toughness, rigidity, yield strength, and others, Mr. Mighton and Mr. Pfister explain the effects each can have on the finished closure. Describing good closure design, they stress the importance of uniform wall thickness, of adequate fillets, and the hazards of undercuts. Pointing out that a knowledge of the injection molding process is an aid to the packaging engineer in the design and use of closures, the authors survey briefly the injection process in a companion article beginning on Page 62.

performance needs

threads when a torque was applied during the capping operation.

Rigidity is a measurement of a polymer's degree of stiffness. As seen in Fig. 2, the rigidity of polystyrene decreases as the toughness increases. Thus, when evaluating materials, you must examine rigidity as well as toughness.

Yield Strength

In addition to toughness and rigidity, high yield strength also is desirable for most closures. It will raise the stress level at which whitening can occur around threads or the top when high torque is applied.

Yield strength also decreases with an increase in toughness (Fig. 2) and, therefore, deserves consideration in the same manner as rigidity. For most threaded closure applications, the "medium-impact" polystyrenes give a good balance of these properties.

Dimensional Stability

Closures should not expand or contract to any great degree when exposed to varying thermal conditions. Expansion from heat would tend to lower removing torque. Contraction effected by cold could cause excessive stress.

The expansion coefficient for polystyrene is very low at 4.7×10^{-5} in./in./°F. Also, closure dimensions must be very uniform from part to part. Polystyrene closures will vary less than $\pm$ 0.001 in. in diameter or height with well-controlled molding operations.

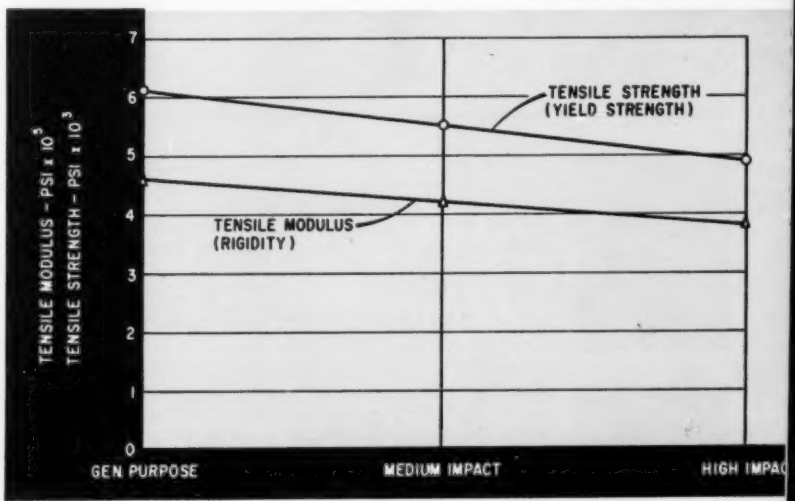
Hardness

Molded closures, subject to abrasion and handling operations, require adequate hardness to maintain good surface gloss. The hardness of all grades of polystyrene has proven satisfactory for most closure applications, but precautions should be taken to avoid rough handling.

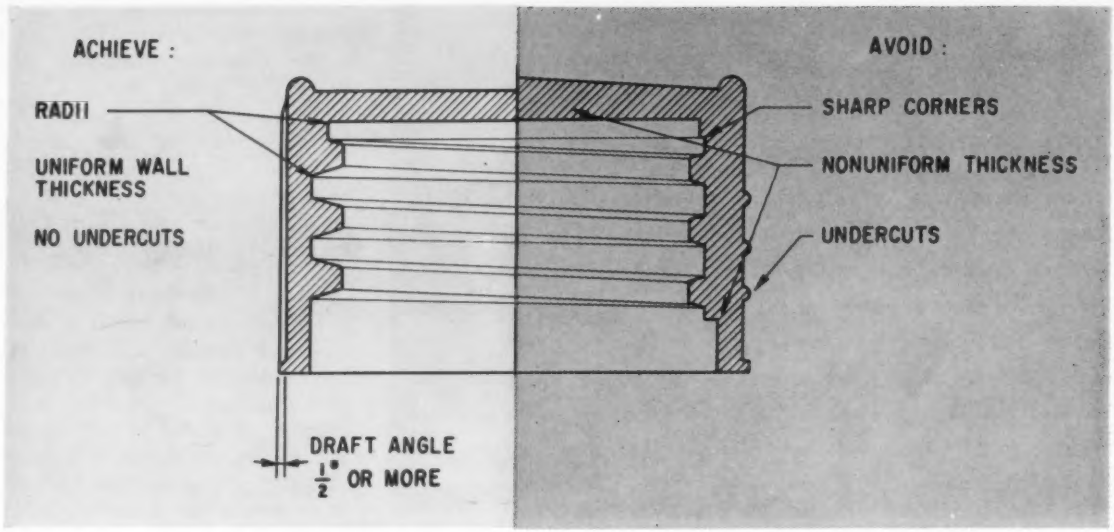
Chemical Resistance

Closures come in contact with a variety of commodities. Although liners isolate the cap material from the contents of the tube, can, or bottle, there is always a possibility of contact. Somewhat independent of the resistance of a plastic to gross chemical attack is the effect some substances have on the plastic's long-term strength.

This effect may be slight or may be a reduction to less than 10 per cent of the strength of the plastic



2 YIELD STRENGTH AND RIGIDITY OF POLYSTYRENE decrease as toughness increases. Adequate rigidity prevents closure overriding its threads when torque is applied; high yield strength raises stress level at which whitening occurs at threads when torque is applied.



3 CLOSURE CROSS SECTION. Note important design considerations: Uniform wall thickness promotes better performance characteristics; proper fillets reduce concentrated stresses; undercuts should be avoided or used in such a manner that closure can be removed from mold easily.

in air. The design engineer, aware that metals, ceramics, and even glass, as well as plastics, are environment-sensitive, readily understands that knowledge of environment-strength properties is vital where the plastic will be used under stress.

Stress-Cracking

In some instances, chemical attack, especially under stressed conditions, can cause stress-cracking. In discussing stress-cracking, it is well to first define critical stress. This is the highest stress a material can sustain without failure. Critical stress is affected by time, temperature, and environment.

When environment reduces the critical stress below the sum of internal and external stresses in the part, "stress-cracking" occurs. Axiomatically, we can restate the definition of critical stress as "that tensile stress above which stress-cracking starts in a given environment at a given temperature and time."

Environmental stress-cracking occurs, in comparison with short-term tensile strength, at relatively low stresses. The cracks may be external or internal. It is possible for the fine internal cracks to join together and develop a definite external breakage crack. The cracks are the result of brittle, rather than ductile, failure and they are characterized by glossy, smooth edges at the failure.

Impact polystyrenes will retard such crack propagation more effectively than the general-purpose types. In the impact types, the small cracks encounter rubber particles and their growth is thereby inhibited.

Resistance To Attack

Published literature, available from most material suppliers, provides chemical resistance data on various thermoplastics for a large number of reagents. In general, polystyrenes have good resistance to chemical attack from many reagents such as alkalies, salts, dilute mineral acids, lower alcohols and water.

Some softening or lowering of working stress is caused by higher alcohols, gasoline, ketones, unsaturated hydrocarbons, and essential oils. Applications in which the ef-

J. W. Mighton is a graduate of Carnegie Institute of Technology with a B.S. degree in metallurgical engineering. He joined Dow's magnesium division and later transferred to plastics technical service where he presently is head of the molding section. Mr. Mighton is a member of Society of Plastics Engineers.

R. E. Pfister is a graduate of Northwestern University with a B.S. degree in chemical engineering. Joining Dow following his graduation, Mr. Pfister held positions in the plastics production department. Currently, he is specializing in packaging as a field development engineer in the molding section of plastics technical service.

Circle No. 235 on Card, Page 117 ▶

The sparkling tran
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of Dobeckmun's Ultr
Kleer polyethylene
contributing greatly
continued consume
acceptance of 22 di
ferent varieties
beans and peas pac
aged by Chester
Brown Company
Morrill, Nebrask
Packaging costs a
down too becaus
Dobeckmun's pol
ethylene is special
made to conform
high-speed packagi
machinery.

packages for performance

DOBECKMUN

Dobeckmun skill and creativity with polyethylene packaging has helped give hundreds of products the competitive edge at point of sale . . . and the flavor edge at point of serving. Dobeckmun design and printing create packages that make the promise of goodness, and air-tight, moisture-proof Dobeckmun polyethylene protects the flavor and freshness that keep it! Put Dobeckmun packaging skill and durable, low-cost Dobeckmun polyethylene to work for you on the store shelves and dinner tables of America with Packages for Performance by THE DOBECKMUN COMPANY, A Division of The Dow Chemical Company, Cleveland 1, Ohio • Berkeley 10, California • Offices in most principal cities.

fect of the reagent is unknown should be thoroughly tested, both by the product packager and the plastic material supplier.

Permeability

Permeability of a closure is affected mostly by the type of cap liner used. If high water-vapor and gas transmission will be harmful in the packaging of a given commodity, you may choose a cap lining material which retards or prevents transmission. Consequently, the permeability of the closure material itself is not too important in such instances.

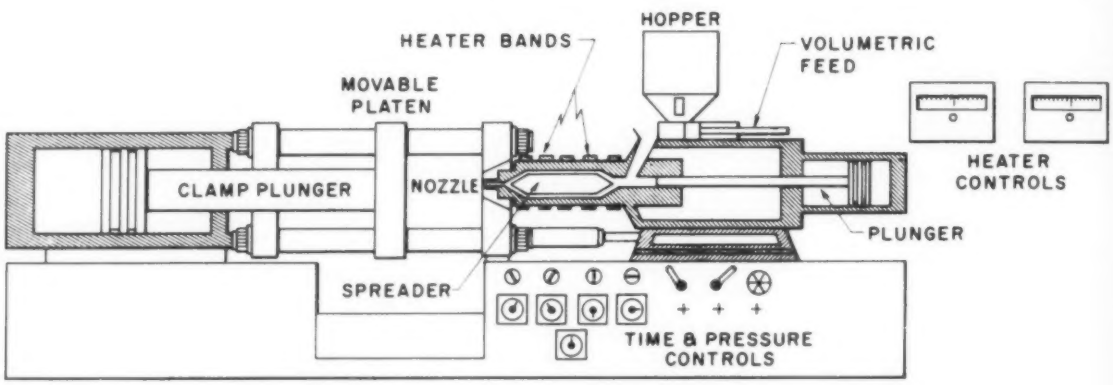
Transmission rates for polystyrene are quite low. Obviously, transmission rates vary for different materials, and are affected by temperature and by the average wall thickness. For a common closure made of polystyrene, water-vapor transmission would approximate 0.1 to 0.2 gm./100 sq. in./24 hr. at 100°F. and 95 per cent R. H. Air transmission can be estimated at 2 to 4 gm./100 sq. in./24 hr./atm. at 75°F.

Odor, Taste, Toxicity

Odor and taste levels of high quality polystyrenes are very low and are seldom a problem. We recommend low molding temperatures for applications requiring minimal levels of odor and taste. In extreme cases, special formulations can be supplied.

Further, these same high quality polystyrenes offer no health safety problems when used in contact with foodstuffs and beverages. The Food and Drug Administration has, in the past, recognized polystyrenes as suitable for such contact and there is no reason to believe that it will not recognize the use of the quality polystyrenes in the future.

(Continued on Page 67)



1 CONVENTIONAL INJECTION MOLDING MACHINE. Commercial equipment is capable of producing plastic parts in temperature range of 325° to 700° F at pressures varying from 5,000 to 20,000 lb./sq. in.

Injection molding process

Here is a discussion of the injection molding process presented as complementary to Mr. Mighton's and Mr. Pfister's article on threaded closures, appearing on Page 58.

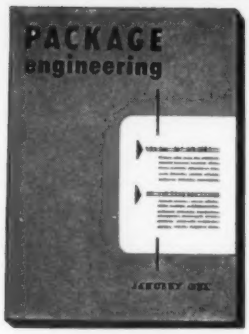
A brief survey of the injection molding process, including a discussion of machine operation and mold design, should aid the packaging engineer both in the design and in the use of polystyrene closures.

Injection Molding Process

Injection molding differs from other thermoplastic fabricating techniques primarily in the way the plastic is shaped and also in the way the plastic is softened by heat. The injection molding process consists mainly of the following steps:

1. Plasticize the plastic thoroughly in the heating cylinder.
2. Force the proper amount of plastic into the mold as rapidly as possible.

(Continued on Page 68)



Exhibitors

29th AMA National Packaging Conference Of 1960

EXHIBITOR	BOOTH	HOTEL
A-B-C Packaging Machine Corp.	550	Crillon
Abbott Plastic Machine Corp.	1157	
Acme Steel Co.	565	Ritz-Carlton
Addressograph Multigraph Corp.	650-52-54	
Adjusto Equipment Co.	117	Sun 'n Sand Motel
Algene Marking Equipment Co.	126	
Aluminum Co. of America	111	Americana
Aluminum Foils, Inc.	617	Claridge
Amaco, Inc.	1024	
American Can Co.	246	Dennis
American Excelsior Corp.	205	Dennis
American Latex Fibre Corp.	1228	
American Partition Co.	133	Claridge
American Viscose Corp.	420-26	Shelburne
Amsco Packaging Machinery Inc.	516	Nautilus Motel
Anaconda Aluminum Co.	922-24	Claridge
The Mark Andrews Co., Inc.	630	
Apex Machine Co.	119	Colony Resort Motel
The Arabol Manufacturing Co.	263	Claridge
Armstrong Cork Co.	1531	
Atlas Vac-Machine Corp.	1326	
Auto-Vac Co., Div. of National Cleveland Corp.	1408, 1412	Shelburne
Avery Label Co.	153-55	Shelburne
AviSun Corp.	1101-02	Shelburne, Empress Motel
Barnes Drill Co.	1429-31	
Bartelt Engineering Co.	1142, 1148	Claridge
Behr-Manning Co., A Div. of Norton Co.	917	Dennis
Bell-Mark Corp.	1003	
Bemis Bro. Bag Co.	404-06	Ambassador
Bensing Bros. & Deeney Sales Co.	542, 546	Shelburne
Bernardin Bottle Cap Co.	918	Dennis
Better Packages, Inc.	130	Dennis
Biner-Ellison Machinery Co.	211	
Bivans Corp.	503	Dennis
Blocksom & Co.	1216	Traymore
Borden Chemical Co.	1427	
Bostitch, Inc.	221, 225	Chalfonte-Haddon Hall
Boxboard Containers	442	
W. H. Brady Co.	1304	Dennis
W. Braun Co., Inc.	527	Ritz-Carlton
The Brown-Bridge Mills, Inc.	121-23	Chalfonte-Haddon Hall
B. H. Bunn Co.	1227	
The Burnet Co.	1317, 1416	
F. L. Burt Co.	1316	Dennis
F. N. Burt Co., Inc.	649	Marlborough-Blenheim
Campco, Div. of Chicago Molded Products Corp.	1005	
Carbert Manufacturing Co., Inc.	1357	Traymore
Cel-Fibe Div., Personal Products Corp.	1453	Claridge
Celanese Corp. of America	342	Shelburne
Celluplastic Corp.	1217	Dennis
The Celotex Corp.	1153	
Ralph Chaffee & Co.	268	Eastbourne
The Champion Paper and Fibre Co.	1123, 1127-29	Ritz-Carlton
Chanal Plastics	1532	Traymore
Chase Bag Co.	1131-35	
Chase Equipment Corp.	271	Dennis
Chaspec Manufacturing Co.	245, 249	
Chicago Printed String Co.	1458	
Chippewa Plastics Co.	1518	
Cincinnati Box & Partition Co.	1538	Claridge
Claremont Pigment Dispersion Corp.	923-25	Chalfonte-Haddon Hall
The Clark-Aiken Co.	1023, 1122	Claridge
J. L. Clark Manufacturing Co.	908, 912	Chalfonte-Haddon Hall
The Cleveland Container Co.	538	Ritz-Carlton
Cleveland Lathe & Machine Co.	1505	
Climax Products Div., The Lodge & Shipley Co.	1417	Shelburne
Collapsible Tube Manufacturers Council	1301	Shelburne
Columbian Rope Co.	118	
Comet Industries	1223	John's Motels
Conapac Corp.	251	
Consumer Packaging	442	
Continental Can Co., Inc.	545-47, 551-53, 563	
The Cottrell Co.	1402	
Crown Cork & Seal Co., Inc.	254	Claridge
Crown Zellerbach Corp.	303-05, 313	
S. Curtis & Son, Inc.	928-30, 934	Marlborough-Blenheim
Daher Co., Inc.	638	Ritz-Carlton
Joseph Davis Plastics Co.	1428-30	
Delaware Barrel & Drum Co., Inc.	937, 1038	
Dennison Manufacturing Co.	534	Marlborough-Blenheim
Dependable Compressor & Machine Co., Inc.	1230-32	Dennis
Derby Sealers, Inc.	325	Shelburne
C. H. Dexter & Sons, Inc.	1323, 1327	
Diagraph-Bradley Industries, Inc.	158	
Diamond National Corp., The Gardner Div.	1441-49, 1540-48	
Diamond Plastics Industries, Inc.	1405-07	Traymore
Dispens-A-Label Devices	656	
The Dobeckmun Co., Div. of The Dow Chemical Co.	435	Claridge
E. I. du Pont de Nemours & Co.		
Film Department	464	Dennis
Freon Division	454	Shelburne
Polychemicals Department	434-38, 535-37	
John Dusenbery Co., Inc.	1041	
Dyna-Foam Corp.	906	
Eastern Corrugated Container Corp.	1409	Traymore
Eastern Duo-Fast Corp.	1034	
Eastman Chemical Products, Inc.	304, 312	
Eastman Kodak Co.	556, 560	Dennis
Ekco-Alcoa Containers Inc.	345	Shelburne
Electronic Machine Parts, Inc.	368	Shelburne
Emhart Manufacturing Co., Portland Div.	640-42	Chalfonte-Haddon Hall
Enjay Co., Inc.	1201	Traymore
Erdco Engineering Corp.	1446	Chalfonte-Haddon Hall
Eriez Manufacturing Co.	1309	
Errich International Corp.	1001	Castle Roc Motel
Ertel Engineering Corp.	901	Claridge
Facile Corp.	542, 546	Shelburne
Felins Tying Machine Co.	129	Ambassador
Fibre Drum Manufacturers Association	660-62	Claridge
Fife Manufacturing Co.	164	Madison
The F. G. Findley Co.	204	Saxony Motel
Dave Fischbein Co.	57	Dennis
Flex-O-Glass, Inc.	1530	Lombardy Motel
Fluid Chemical Co., Inc.	1502	Shelburne
FMC, Packaging Machinery Div.	520, 526, 530	Dennis
Hudson-Sharp Machine Co.		
Kingsbury & Davis Plant		
Simplex Plant		
Stokes & Smith Plant		
Foampak Corp.	1519	
Food and Drug Packaging	1042	
The Walter Frank Organization	1513	Claridge
Frazier & Son	516	
H. B. Fuller Co.	1218	Traymore
Gaylord Container Corp.	303-05, 313	
General Box Co.	111	Claridge
General Chemical Div., Allied Chemical Corp.	1315-47-49, 1353	
General Printing Ink Co., Div. of Sun Chemical Co.	542, 546	Shelburne
General Research & Supply Co.	1240-42	Ritz-Carlton
Geveke & Co., Inc.	142	Chalfonte-Haddon Hall
Gibbs Automatic Moulding Div., Pierce Industries Inc.	1322	Shelburne
Glassine & Greaseproof Manufacturers Association	104	

The Goodyear Tire & Rubber Co.	441	
Adolph Gottscho, Inc.	629	LaConcha
GPE Controls, Inc.	659	Shelburne
W. R. Grace & Co., Polymer Chemicals Div.	1209, 1312	Dennis
Graphic Supply Co.	1207	Chalfonte-Haddon Hall
Gray Co., Inc.	1229	
Graymills Corp.	1535	Shelburne
The Greif Bros. Cooperage Corp.	1248-1254	Claridge
Griffin-Rutgers, Inc.	1516	Chalfonte-Haddon Hall
B. F. Gump Co.	635	Ambassador
Ferdinand Gutmann & Co.	125	Ritz-Carlton
Hans Hagen	1527	
Hampton Manufacturing Co., Industrial Tape Div.	1149	
Harris-Intertype Corp.	1402	Shelburne
Hayssen Manufacturing Co.	410	
Haywood Publishing Co.	442	
Hedwin Corp.	159	Colony Resort Motel
Heekin Can Co.	931	Claridge
Heinrich Equipment Corp.	213-17	Traymore
Hobbs Manufacturing Co.	613	
Allen Hollander Co., Inc.	614-16	Shelburne
Howard Publishing Co.	1432	
Ideal Stencil Machine Co.	622-24	Ambassador
Ideal Tape, Inc.	1002	
The Impact-O-Graph Corp.	1324	Diplomat Motel
Index Industrial Corp.	1520	
Industrial Packaging	442	
Intaglio Service Corp.	208	Shelburne
Interchemical Corp., Printing Ink Div.	329	Claridge
International Eastern Co.	1329	Colony Resort Motel
International Paper Co.	1239-53, 1338-54	Chalfonte-Haddon Hall
International Staple & Machine Co.	429	
J. G. Machine Works	1533	
The Jackmeyer Corp.	1522-24	Ritz-Carlton
Janesville Cotton Mills	1048	Dennis
Jiffy Manufacturing Co.	412	Traymore
Johns-Manville Sales Corp., Dutch Brand Div.	1105	Shelburne
Jones & Laughlin Steel Corp., Container Div.	1426	
Oscar I. Judelshon	935	Ritz-Carlton
Kahlenberg Globe Equipment Co.	103	Traymore
Kaiser Aluminum & Chemical Corp.	257-58, 1358	Dennis
The Kartridg Pak Co.	669	Shelburne
The Kendall Co., Polyken Sales Div.	1246	Saxony Motel
Kerma Sales Corp.	1401	
Keyes Fibre Co.	1321	Claridge
Kimberly-Clark Corp.	351	Chalfonte-Haddon Hall
Kleen-Stik Products, Inc.	663	Traymore
Koppers Co., Inc.	1104	Marlborough-Blenheim
Frederick A. Krause Associates, Inc.	127	
Kurhan Co., Inc.	1318	
Labelette Co.	1215	Shelburne
Lassiter Corp.	113-15	Claridge
LectrOmatic Devices, Inc.	1331-35	Runnymede
Leedpak, Inc.	604-06	Shelburne
Lever Manufacturing Co., Inc.	1044	
The Lily Tulip Corp.	919-21	
Linear Products, Inc.	1528	Claridge
Long and Co., Inc.	1238	
Ludlow Papers, Inc.	1017	Dennis
MRM Co., Inc.	203	
Manhattan Adhesives Corp.	154	Traymore
Markem Machine Co.	621	Diplomat Motel
Marsh Stencil Machine Co.	655	Dennis
Martin Engineering Co.	1225	Claridge
The Mead Corp.	Stage	
Melrose Packaging Corp.	608	
Mercury Heat Sealing Equipment Co.	370	
Metal Edge Industries	446	Claridge
Mettler Instrument Corp.	1308	Empress Motel
Michigan State University, Packaging Foundation, Inc.	1539	
Miller Wrapping & Sealing Machine Co.	516	
Milprint, Inc.	229	Claridge
Minnesota Mining and Manufacturing Co.	212, 218, 222, 230	Shelburne
Modern Packaging	529	
The Monarch Marking System Co.	1147	
Monroe-Danford and Co.	1557	Diplomat Motel
Monsanto Chemical Co. Inorganic Div. Plastics Div.	927-29, 364	Chalfonte-Haddon Hall
Moonglow Plastic Jewel Corp.	648	Empress Motel
Morningstar-Paisley, Inc.	541	Dennis
Mosstype Corp.	138	Shelburne
The Multistamp Co.	267	
Mystik Adhesive Products, Inc.	601	Ambassador
Nashua Corp.	150	
National Barrel & Drum Association, Inc.	1433	
National Bundle Tyer Co.	636	
National Equipment Corp.	163	Shelburne
National Foil Co.	1302	Claridge
National Packaging Corp.	1208	Shelburne
National Paper Box Manufacturers Association, Inc.	141-43	Dennis
National Starch and Chemical Corp.	334	Dennis
New Era Manufacturing Co.	644-46	Empress Motel
New Jersey Machine Corp.	505	Dennis
Ohio Chemical & Surgical Equipment Co., Div. of Air Reduction Co.	1526	Marlborough-Blenheim
Olin Mathieson Chemical Corp.	1116	
Oliver Machinery Co.	637	Empress Motel
Ortman-McCain Co.	1439	Shelburne
Owens-Illinois Glass Co.	234-42	Claridge
Oxy-Dry Sprayer Corp.	1454	Shelburne
Packaging Components, Inc.	1519, 1454	
Packaging Industries Limited, Inc.	352	Ambassador
Packaging Institute	1517	
Pack-Rite Machines, Div. of Techtmann Industries	450	Tropicana Motel
Pamarco Inc.	920	
Pan Industrial Corp.	1504, 1508	
Permacel	513, 517	Claridge
Pfaudler Co., Div. of Pfaudler Permutit Inc.	653	
Photomation, Inc.	1425	Dennis
Photo-Process Screen Manufacturing Co.	1227	
Pitney-Bowes, Inc.	554	Chalfonte-Haddon Hall
Plastics World	272	
PlastOCraft Corp.	509	
Plastomatic Corp.	1418	Dennis
Plax Corp.	463	
Pneuma-Flo Systems, Inc.	916	Empress Motel
Popper & Sons, Inc.	135-37	
Potdevin Machine Co.	416	Dennis
The Printing Machinery Co.	105	Ambassador
Production Equipment, Inc.	1317, 1416	
Pyroxylin Products, Inc.	1307	Shelburne
Quickpak Machinery Corp.	618	
Rainbow Ribbons & Fabrics Inc.	369	
The Rapids-Standard Co., Inc.	1033	Traymore
Reynolds Metals Co.	330	
Rheem Manufacturing Co.	1107-09	Claridge
Riegel Paper Corp.	363	Shelburne
Rossotti Lithograph Corp.	269-70	Shelburne
St. Regis Paper Co.	905-07-09-13, 1004-08-12	
G. T. Schjeldahl Co.	1013	Dennis
Seal-A-Round Corp.	902	
Sealright Co., Inc.	145-47	Colony Resort Motel
The Seamless Rubber Co.	1212	
Shopsin Paper Co.	620	Shelburne
Signode Steel Strapping Co.	1016-18-20	Dennis
The Simco Co.	1320	Empress Motel
Simon Adhesive Products Corp.	1054	Traymore
Simplex Binder Co.	1415	Eldorado Motel
Sinclair and Valentine Co.	413	Traymore
H. P. Smith Paper Co.	122	Ambassador
Soabar Co.	1204	
Sohn Machine Co.	1154	Tropicana Motel
Southern Adhesives Corp.	204	Dennis
Speedry Products, Inc.	112	Ritz-Carlton
Spencer Chemical Co.	1305, 1404	Chalfonte-Haddon Hall
Standard Instrument Corp.	1421	Empress Motel
Standard Paper Box Machine Co., Inc.	1558	Ambassador
Stanford Engineering Co.	1137, 1145	Shelburne
Sterling-Fleischman Co.	1457	Martinique
Stoffel Seals Corp.	661	Ritz-Carlton
J. F. Stokes Corp.	1201	
Sun Chemical Corp.	542, 546	Shelburne
Swift & Co.	641-45	Shelburne
Switzer Brothers Inc.	1423	Lombardy Motel
Syntron Co.	1341	
Technical Tape Corp.	610-12	Ritz-Carlton
Tee-Pak, Inc.	1553	Shelburne
Thatcher Glass Manufacturing Co., Inc.	564	Claridge
Thomson-National Press Co.	1420	
Tipper Tie Inc.	1448	Dennis
Toledo Scale, Div. of Toledo Scale Corp.	1140	Claridge
Tompkins' Label Services	664-66	Claridge
Trade Manufacturing Co.	902	
Tri-State Plastic Molding Co.	628	Chalfonte-Haddon Hall
Tri-Wall Containers, Inc.	100	Traymore
Tronomatic Machine Corp.	1438	Dennis
Union Bag-Camp Paper Corp.	335, 341	Shelburne
Union Carbide Plastics Co.	353	Traymore
Union Paste Co.	204	Shelburne
Union Steel Products Co.	322	Dennis
U. S. Engineering Co.	149-51	
U. S. Industrial Chemicals Co.	1231-33-35, 1328-30-32	Traymore
U. S. Printing & Lithograph Co.	1023	Shelburne
U. S. Steel Products Div., U. S. Steel Corp.	627	
U. S. Steel Supply Div., U. S. Steel Corp.	1117, 1121	
Vac-Tie Fasteners Inc.	265	
The Varigraph Co.	1050	Dennis
Varn Products Co., Inc.	1523	Saxony
B. Verner & Co., Inc.	146	
Vertrod Corp.	658	Empress Motel
Web Controls Corp.	1055	
Weber Marking Systems Inc.	148	Dennis
West Insrument Corp.	1220	Traymore
West Virginia Pulp and Paper Co.	235-37, 241	Dennis
Weyerhaeuser Co.	1512	
T. C. Wheaton Co.	1026, 1030	
The S. S White Dental Manufacturing Co.	1440	Lombardy Motel
Wolverine Paper Converting Machinery Corp.	634	Ambassador
Wood Conversion Co.	134	Shelburne
Wrap-Ade Machine Co., Inc.	365	LaConcha
J. G. Yahnke Co.	1442	
York Tape Printers, Inc.	139	Dennis

AMA conference program

American Management Association is holding its 29th National Packaging Conference April 4-6 at Atlantic City's Convention Hall. Following are the features of the program and the speakers discussing them:

Monday, April 4th:

9:30-12:30 a. m. General session: *Packaging For Profit* (Grand Ballroom). Henry Schniewind, vice president, Spring Mills, Inc., N. Y., chairman; Orlin E. Johnson, vice president in charge of production, Bristol-Myers Products Division, Bristol-Myers Co., Hillside, N. J.; Gordon C. McNown, controller, Mead Johnson & Co., Evansville, Ind.; J. W. Kirsch, executive vice president—operations, Kirsch Co., Inc., Sturgis, Mich.; R. L. Lozon, director of purchases and trade relations, The Glidden Co., Cleveland; F. W. Priess, manager, product and package design, Montgomery Ward & Co., Chicago.

Tuesday, April 5th:

9:30-12:30 a. m. Three concurrent sessions. *Package Production* (Committee Room No. 20). S. C. Torno, vice president, Danforth Wines, Ltd., Toronto, chairman; R. P. Gardner, vice president-manufacturing, S. C. Johnson & Son, Inc., Racine, Wis.; Donald L. Rogers, vice president, Comet Rice Mills, Dallas; Glen Nowotny, production manager, Ray-O-Vac Co., Madison, Wis.; R. J. Lappin, chief mechanical engineer, school equipment div., Brunswick-Balke-Collender Co., Kalamazoo, Mich.

Package Research (Committee Room No. 21). C. L. Rumberger, vice president, Research & Quality Control Div., H. J. Heinz Co., Pittsburgh, chairman; C. D. Schoby, manager, package development and design dept., Armour and Co., Chicago; T. W. Petty, packaging loading engineer — central operations, United States Steel Co., Pittsburgh; John R. McCarty, vice president, The Frito Co., Dallas; R. G. Edwards, vice president, American Hardware Corp., New Britain, Conn.

Package Marketing (Grand Ballroom). J. J. Culberg, vice president — marketing, Ekco Products Co., Chicago, chairman; Edward L. Slater, director of advertising, Sylvania Electric Products, Inc. N. Y.; Lloyd W. Dunn, vice president, Capitol Records, Inc., Hollywood, Calif.; Charlotte Montgomery, consultant and columnist, *Good Housekeeping* Magazine, N. Y.

Wednesday, April 6th:

9:30-12:30 a. m. General session: *The Profiles of Packaging* (Grand Ballroom). Henry Schniewind, vice president, Spring Mills, Inc., N. Y., chairman; "Package development and engineering": W. H. Enzie, materials services director, General Foods Corp., White Plains, N. Y.; Robert B. Etter, plant manager, Lewis-Howe Co., St. Louis; Charles R. Gustafson, chief engineer, packaging, American Radiator & Standard Sanitary Corp., Louisville; George R. Ryan, director of packaging, Abbott Laboratories, North Chicago, Ill.; Paul O. Vogt, consultant, Spencerville, Ind.

"Package design and merchandising": Saul Bass, designer, Los Angeles; Carmon M. Elliott, manager of packaging design department, Eastman Kodak Co., Rochester; Karl Fink, Karl Fink & Associates, N. Y.; Max Rogers art director, Avon Products Inc., N. Y.; Walter Stern, technical director, Raymond Loewy Associates, N. Y.; Prof. J. Doblin, Illinois Institute of Technology, Chicago.

Conference Registration Fees: Full conference, $25.00 each person for AMA Members, $35.00 — non-members. For single day session, $10.00 — AMA members, $15.00 — non-members. Conference registration includes admission to packaging show.

These are the hotels where exhibitors are staying:

AMBASSADOR
Stenton Place & Boardwalk
ATlantic City 5-4141

CASTLE ROC MOTEL
3000 Pacific Avenue
ATlantic City 6-3196

CHALFONTE-HADDON HALL
N. Carolina Avenue & Beach
ATlantic City 4-0141

CLARIDGE
Park Place & Beach
ATlantic City 5-1271

COLONY RESORT MOTEL
First & S. Granville Avenues
ATlantic City 2-0082
South Indiana Avenue & Boardwalk
ATlantic City 4-6121

CRILLON
Pacific & Indiana Avenues
ATlantic City 5-8543

DENNIS
Michigan Avenue & Beach
ATlantic City 4-8111

DIPLOMAT MOTEL
2800 Pacific Avenue
ATlantic City 4-4188

EASTBOURNE
1807 Pacific Avenue
ATlantic City 5-2226

ELDORADO MOTEL
Pacific & Iowa Avenues
ATlantic City 5-5956

EMPRESS MOTEL
Michigan Avenue near Boardwalk
ATlantic City 4-7031

JOHN'S MOTEL
Pacific & Montpelier Avenues
ATlantic City 5-2500

LA CONCHA
Boardwalk & Chelsea Avenue
ATlantic City 6-9101

LOMBARDY MOTEL
Boardwalk & Kentucky Avenue
ATlantic City 4-7001

MADISON
123 S. Illinois Avenue
ATlantic City 4-8191

MARLBOROUGH-BLENHEIM
Park Place & Boardwalk
ATlantic City 5-1211

NAUTILUS MOTEL
3501 Pacific Avenue
ATlantic City 4-3132

RITZ-CARLTON
Iowa Avenue & Boardwalk
ATlantic City 4-3051

RUNNYMEDE HOTEL
116 South Park Place
ATlantic City 4-6571

SAXONY MOTEL
Pacific & Michigan Avenues
ATlantic City 4-7146

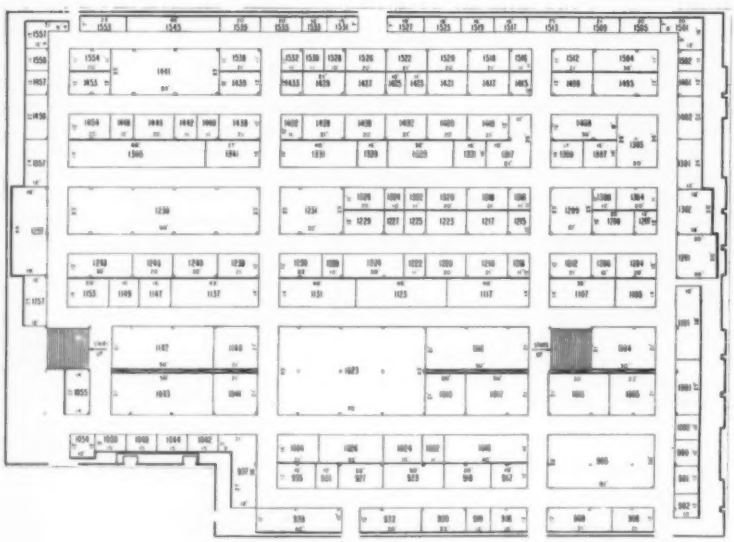
SHELBURNE
Michigan Avenue & Boardwalk
ATlantic City 4-8131

SUN 'N SAND MOTEL
Providence Avenue & Boardwalk
ATlantic City 5-9566

TRAYMORE
Illinois Avenue & Boardwalk
ATlantic City 4-3021

TROPICANA MOTEL
Boston & Pacific Avenues
ATlantic City 4-4158

Floor plan of booth locations at AMA National Packaging Exposition



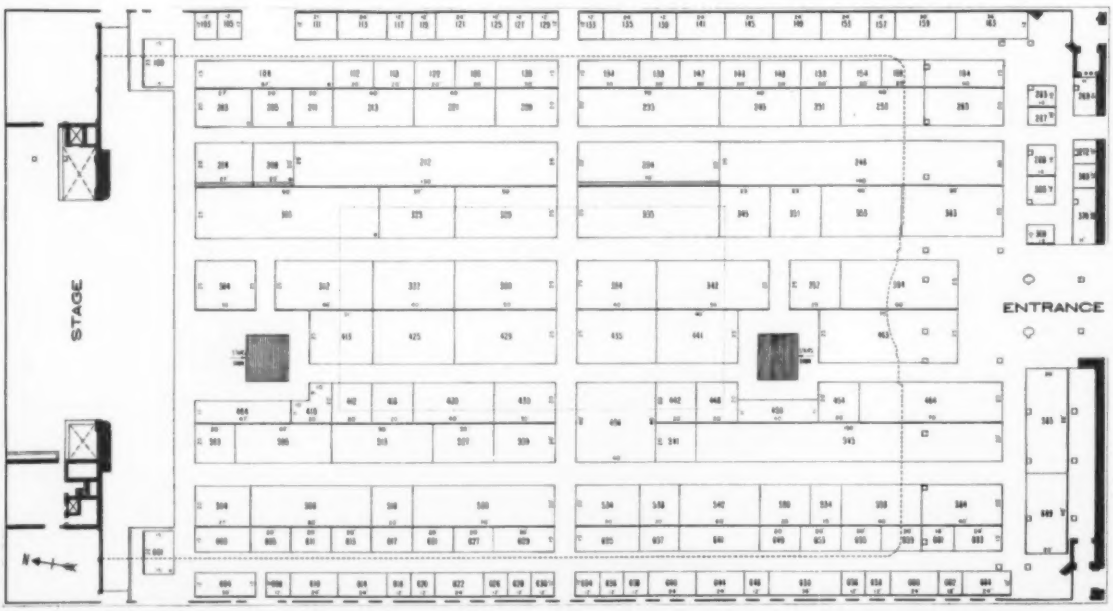
Hours of the Exposition:

Monday, April 4 — 10:00 a.m. to 6:00 p.m.

Tuesday, April 5 — 10:00 a.m. to 9:00 p.m.

Wednesday, April 6 — 10:00 a.m. to 6:00 p.m.

Thursday, April 7 — 10:00 a.m. to 4:00 p.m.



Heat Resistance

Plastic closures must have adequate heat resistance to withstand a wide range of shipping and storage conditions. They also should be high enough in heat resistance to withstand the temperatures involved in vacuum metalizing if a decorative plating is desired. Heat resistance values for polystyrene are in the range of 170° to 210°F.

Changing conditions of injection molding can affect the heat resistance of the parts because of the variation in internal stresses set up. Higher stresses reduce the practical heat resistance. However, molding to produce low internal stresses specifically to protect heat distortion values may adversely affect factors such as economy and appearance.

Quality Of Appearance

Quality of a closure is often dependent upon its internal color dispersion, color control from batch to batch, and a surface free from blemishes. Polystyrene has an almost unlimited colorability range, and, through modern techniques of instrumentation and years of color experience, color control and dispersion of pigments has become excellent. Closures of polystyrene can consistently be made, whose surfaces will be free of defects such as sinks (dimples), streaks, weld lines, specks, and scratches.

CLOSURE DESIGN

Design of a closure must combine the aesthetic and structural aspects of closure dimensions such as shape and wall thickness. In providing the closure specifications, the designer should pay as much attention to the factors determining performance characteristics as he does appearance.

Also, the closure must be produced within certain economic limitations. The designer should be well aware of the various factors in design that affect cost of molding. In closure design, uniform wall thickness, corner fillets, and undercuts need careful consideration.

Wall Thickness

Uniform wall thickness is most important to avoid unsightly sink marks in heavy sections, and, possibly, weak welds in thin sections (Fig. 3). A closure having uniform wall sections not only possesses better appearance but also may have superior performance characteristics (compared to those closures that have been "beefed up" in certain sections). Faster molding cycles with less difficulty are other benefits accruing to closures designed with uniform wall thickness.

Fillets In Corners

Mechanical forces acting on the closure when the cap is mechanically tightened cause stress concentrations. You may reduce these stresses by placing adequate fillets in all of the corners (Fig. 3). However, too generous a radius thickens the section at its junction to the wall, and unattractive sink marks may result.

We suggest fillet radii of approximately 0.010 in. for the thread areas; however, you may have to use slightly smaller radii in the cap top to allow clearance for the liner. If there are vertical serrations on the outer surface, the use of generous radii at the base of each groove will improve circumferential strength of the closure.

Undercuts

An undercut in a molded part is any indentation or protrusion that would normally prevent direct draw removal from the mold. The threads, of course, are severe undercuts and costly unscrewing devices in the mold are necessary to remove the part. No other undercuts on the core should interfere with this rotation.

Indentations or protrusions on the outer surfaces of the cap require the least mold cost when they are parallel with the direction of removal or are at the bottom of the cap skirt. Rings (shown in Fig. 3) or emblems on the outer surface require costly movable cores to permit cap ejection. It is good mold design practice to use a slight draft, e.g. ½°, on the outer walls to facilitate ejection from the cavity half of the mold.

CONCLUSION

Quite obviously, you must take care in selecting a plastic with properties that match the performance requirements of the closure. Polystyrene materials have property profiles which meet most closure requirements.

Where you need high rigidity and moderate toughness, general-purpose polystyrene would be a very suitable selection. However, if you need more toughness and must maintain rigidity, a medium-impact polystyrene would be a better choice.

Finally, proper injection molding techniques and good closure design can greatly improve the appearance and performance properties of thermoplastic closures, as well as help control the cost of thermoplastic closures. *(End)*

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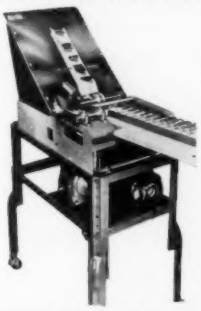

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Injection molding

(Continued from Page 62)

3. Apply sufficient pressure to produce a good finish, free from defects.
4. Allow time for rapid cooling and solidification of the part.
5. Open the mold for ejection of the part and close the mold for the next shot.

While injection molding is a simple cyclic process, the mechanics of performing the above steps can be complicated. Successful and economical production of high-quality injection-molded plastic parts requires careful coordination of all process variables. Some of these variables are independent, but the majority are interdependent so that, solving molding problems takes much experience and study.

The Equipment

Injection molding machines are available from various manufacturers and range in size from less than an ounce to 400 oz. The size refers to the number of ounces of uniformly heated polystyrene which can be shot in one complete stroke of the injection ram.

Another important measure of machine capacity is the pounds per hour of plastic which the heating cylinder can uniformly heat. This value will vary considerably with the different thermoplastics. You must consider carefully both the shot size and the pounds per hour output rating of the machine for each application.

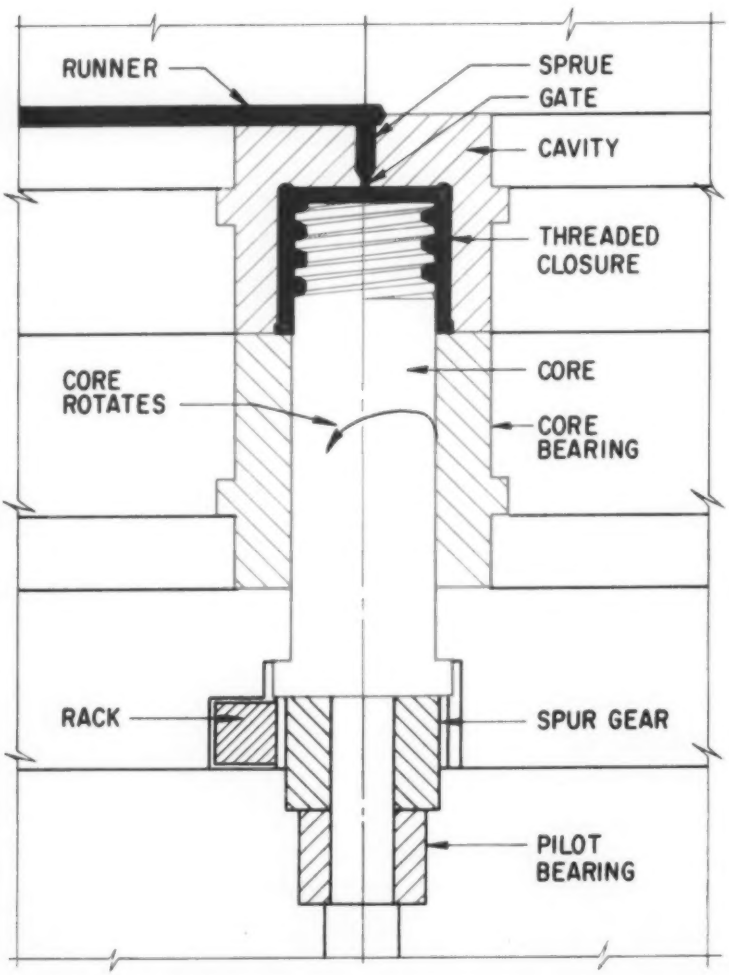
Fig. 1 is a schematic diagram showing a conventional injection molding machine.

The injection end has a granule feed hopper from which the plastic is metered into the cold end of the heating cylinder. The injection plunger, acted upon by hydraulic pressure, compacts the plastic granules and forces them further into the heating cylinder.

Material which has already been heated in the hot end of the cylinder is thereby displaced and is forced out through the nozzle and into the mold. The clamp is the "press" portion of the machine which holds the mold tightly closed during injection and cooling.

Opening the clamping platens separates the two halves of the mold and allows removal of the plastic part. The clamping force usually comes from a hydraulically operated toggle or a straight hydraulic cylinder (shown in Fig. 1).

Commercial molding machines are capable of producing plastic parts in a temperature range of 325° to 700°F. and at pressures varying from 5,000 to 20,000 lb./sq. in. Medium-impact polystyrene closures are molded usually with medium temperatures and high pressures. Selection of the proper conditions, however, depend upon the combination of material, machine, and mold.



2 SECTION OF TYPICAL CLOSURE MOLD where rack and spur gear rotate core. Gate is top center. Design, construction of mold are important to assure trouble-free operation.

Molds

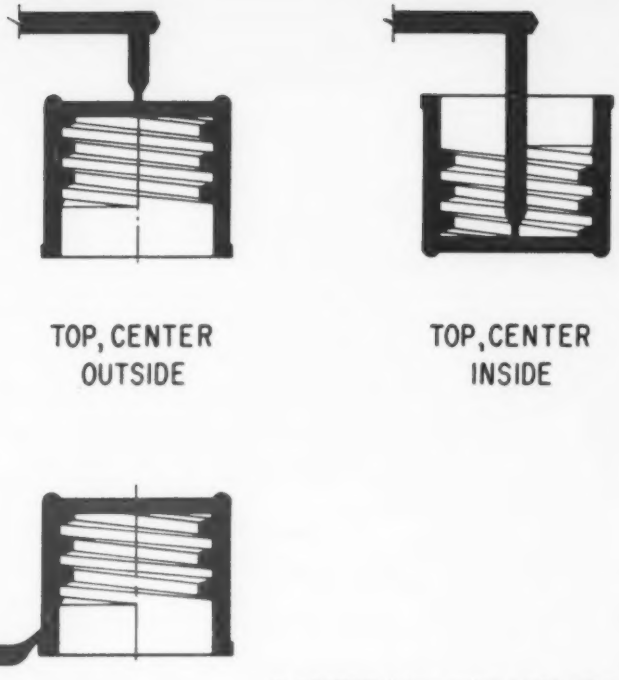
The mold has often been rightfully called the "heart" of the automatic closure molding process. This tool is subjected to thousands of cycles of hot plastic placed in its cavities under high hydraulic pressures. Mold makers must exercise extreme care in the design and construction of closure molds to assure trouble-free operation (Fig. 2).

Unscrewing the cap from the threads is one of the biggest prob-

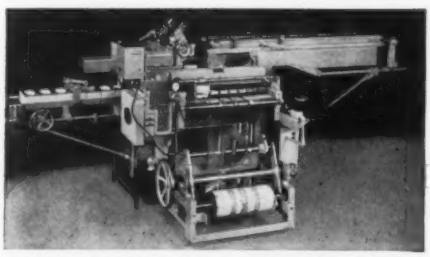
lems faced by the molder and mold maker. The industry currently uses two different techniques: (1) unscrewing the core (the metal that forms the inside surface of the closure), or (2) unscrewing the cavity (the metal that forms the outside surface of the closure). A third technique now under investigation utilizes collapsible cores, with interrupted threads.

Another major difference in mold design is in the location of the gate (the point where the molten plastic enters the mold cavities). Since the gate is an interruption in the smooth plastic surface, it detracts from the appearance of the piece and, therefore, must be kept quite small.

Closures have been gated on the outside top center, on the side, or on the inside top center (Fig. 3). Location of the gate is an important consideration because it determines whether the core or the cavity will rotate, and this, in turn, can influence the cost of manufacturing the mold.



3 **"GATES"** (where molten plastic enters cavity) may be at several different places. Position is important as it determines whether core or cavity will rotate, influencing mold cost. *(End)*



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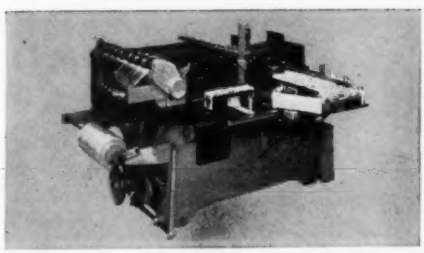

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Abstract

► This study was undertaken to determine the validity and effectiveness of one of the most used, and probably the least understood, evaluation methods. In addition to the analysis of three variations of the basic method, a comprehensive literature survey was made to determine the extent of information available to the public, that existed concerning the laboratory or use-testing of paper multiwall shipping sacks. Little has been written that relates to multiwall shipping sacks themselves, and even less on the methods that can be used to evaluate such containers.

► Three test methods were investigated. The differences in test methods were in the number of drops per cycle and the surface upon which the bag was dropped. Testing was conducted under rigidly controlled conditions to eliminate all possible variables.

► Results obtained indicated that an inner textile bag might be used in such evaluation procedures without marking the effect of the outer paper sack actually being investigated. Differences in the two different bag constructions studied can be detected by the test methods used. Each test type reacts differently toward the bag under test; there is no apparent relationship between test methods.

Let's analyze drop tests for MULTIWALL BAGS

By John O. Younger, *Container Technologist, Research and Methods Analysis Branch, Container Division, Quartermaster Food and Container Institute, Chicago*

The data and facts in this article are taken from the thesis which Mr. Younger prepared for his master's degree at Michigan State University. His discussion is based on research he conducted while under fellowship at Michigan State's school of packaging.

At the present time a number of techniques exist to evaluate paper, corrugated board, fibreboard, and shock absorbing materials. These materials are all manufactured of cellulosic material often in combination with other materials possessing desirable characteristics necessary for the finished product.

With respect to laboratory evaluation of cushioning effects, the information is usually readily translatable into terms of field performance. However, for paper or paperboard containers such as the multiwall shipping sack, no exact laboratory techniques exist — at least none by which such materials may be adequately evaluated to give information on the ability of the container to withstand the rigors of military usage.

Why Need Tests?

Development of a valid test for multiwall shipping sacks would result in monetary savings to the Quartermaster Corps and the Department of Defense. Let us briefly review the situation.

In general, the cost of a container becomes a portion of the selling price and is, as a result,

John O. Younger is a graduate of Lawrence College with a B.A. degree in chemistry. Before joining the Quartermaster as a packaging technologist, he was with Institute of Paper Chemistry, Northern Regional Research Laboratory, and Munising Paper Co. In 1957 Mr. Younger was awarded a Secretary of the Army research and study fellowship. To pursue reseach he proposed under the fellowship, he attended Michigan State University's school of packaging, receiving his M.S. degree in 1959. Mr. Younger is a member of Technical Association of the Pulp and Paper Industry and Packaging Institute.

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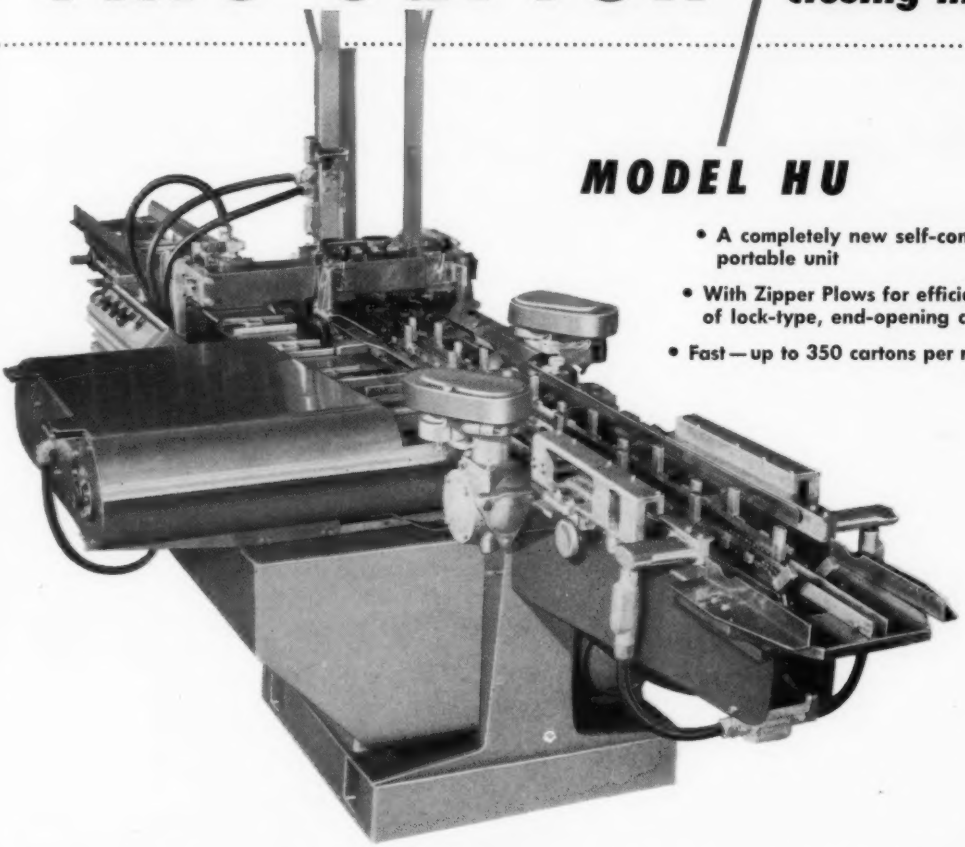

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CHART I

Experimental Details Of Tests Conducted On Multiwall Bags

MATERIALS	PROCEDURES
Test Load 50 lb., net weight of dry, white, U.S. No. 1 grade beans.	**Test Method** All bags conditioned at 73° F. and 50% R.H. for 10 days prior to test. All bags dropped from a 4-ft. height, with dropping continued to failure. (See Fig. 1.)
Test Sample 20 bags for each test type, bag type, and pack style. Statistically a 2x3x2 experiment. A total of 240 bags were tested.	**Point Of Failure** For these tests, failure has been defined as exposure of inner bag or spillage of contents.
Inner Bag (where used) 34/31 (split from 36 in.), 2.95 yard Osnaburg, 16½x30½ in.) after made. Weight: 4½ oz.	**Test Types** I: Two drops per cycle 1. Top; 2. Bottom. II: Four drops per cycle 1. Top; 2. Bottom; 3. Right side; 4. Left side. III: Six drops per cycle 1. Top; 2. Bottom; 3. Right side; 4. Left side; 5. Front; 6. Back.
Outer Bag Sewn open mouth type, 18x33 in. A: 60-90 AL-60-90AL-60ws-60ws B: 60-90AL-60-60-60-60ws.	
Bag Closures Textile, stitched with 6/12 cotton thread. Paper, using 2½ in. width kraft tape, with cotton filler cord and stitched with 6/12 cotton thread. Ends dipped in microcrystalline wax (M.P. 140° F.).	

passed on to the final consumer. In the attempt to reduce costs, large volume commercial users of commodities normally packed in paper multiwall shipping sacks have frequently made recourse to purchase of these commodities in bulk quantities such as truckload, carload, or tank car.

As an example, while the smaller baker will procure sugar and flour by the bag, probably of 100-lb. net weight capacity, the large volume producer will frequently obtain flour in truckload or carload lots. Flour, in this instance, is bulk-loaded directly into the car. Upon arrival at its destination, it will be "pumped" from the car or truck to the storage bin of the bakery. Sugar may arrive as a highly concentrated syrup, thus saving the cost of evaporation, crystalization, and bagging. Similar analogies can be drawn from the construction industry in its purchases of cement and lime, the paper industry in its purchases of clay, starch, and rosin size, etc. In short, bulk handling solves the problem for those who can handle products in bulk lots.

The Quartermaster, however, is the "grocer" to the Armed Forces and one of the largest purchasers of individual food items in the United States. Its situation is a little different. It purchases items on a *relatively* small-scale basis — like what a restaurateur might use.

The paper multiwall shipping sack is used by the Quartermaster Corps to ship items such as sugar, salt, flour, soap powder, cereals, and various non-liquid chemicals. Because of the volume, a very small cost reduction per unit bag would, over a period of a year, amount to a significant sum.

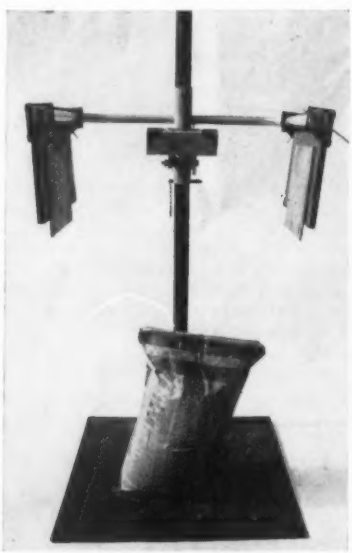
Based on paper production for two given three-month periods in 1949 and 1950 *(3)*, it has been estimated that slightly more than 8 per cent of the paper production is used for bags and shipping sacks. Eight per cent of the annual paper production of the United States runs into millions of dollars, and the Army uses its proportionate share of this amount.

Annual paper production in the United States for 1956, not including construction paper, wet-machine board, boxboard or corrugated board, amounted to 13,976,-381 tons *(6)*. This, then is the background that permits one to say that multiwall shipping sacks of tested performance would result in monetary savings for the institutional type of buyer.

Lack Of Information

A peculiar situation exists today. With such a commonplace article as a multiwall shipping sack, it is surprising that so little information

Bag in position for butt drop.



Typical butt drop.

Fig. 1. Drop test apparatus used in making multiwall bag tests, results of which are analyzed.

U.S.I. POLYETHYLENE NEWS

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MARCH, 1960 — U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation — 99 Park Ave., N. Y. 16, N. Y.

Packaging Notes

Skin suspension packaging with polyethylene film is being used with great success for shipping pottery and ceramic products.

The packages consist of a low density polyethylene skin suspension on a polyethylene-coated corrugated board. The coated board is perforated to allow a vacuum to be drawn through it. Then, products are placed on the board and 6-10 mil polyethylene film is heated, vacuum formed around the products, and heat sealed to the board. The completed unit is packaged in a corrugated container for shipment.

This packaging technique has cut gross shipping weight by 40%, and in-transit breakage has been reduced by more than 60%.

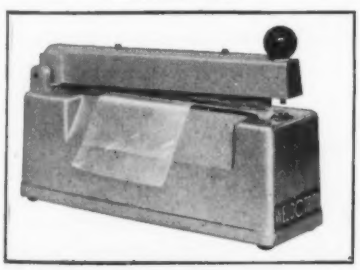
Now... polyethylene packaging for people!

A rectangular-shaped tent of polyethylene film is currently being marketed for use at football games and other outdoor sporting events. The tent is opaque except for a clear polyethylene viewing window. The tent keeps heat in — rain and snow out.

Polyethylene film packaging for carbon-steel tubes has proved to be economical for a New Jersey refinery.

Polyethylene film is wrapped around a cluster of tubes and taped securely closed. Wrapping with polyethylene in this way protects the tubes from rust and corrosion during storage.

Another advantage: packaging cost is said to be one-eighth that of the military-style moth balling the company formerly used.



A polyethylene bag sealer for small lots and laboratory use is now being marketed by a New Jersey Company.

The new compact polyethylene heat sealer is only 4 inches wide and 12½ inches long. It is portable and may be plugged into a standard 110 to 120 A-C outlet. The sealer will produce seals up to eight inches long. Sealing time is one-half to two seconds, according to the thickness of the film.

Improved Film-Clarity Meter Designed by U.S.I. Chemist

New Instrument Eliminates Human Error in Testing Clarity

A research chemist at U.S.I. has designed in conjunction with A.S.T.M. a new light transmittance meter which eliminates human error in testing clarity of polyethylene film. The instrument determines the relative amount of light transmitted through any film specimen at essentially a zero angle of scatter.

This new low-angle light transmittance meter was developed at the Polymer Service Laboratories of U. S. I.

The new meter is designed to replace the optical bench test... a method which depended on the operator's eye-sight. With the new meter, test results are recorded automatically, without relying on the judgment of the operator.

Operation of the Meter

Basically, the meter consists of a light source which is concentrated through a sample of film onto a light-sensitive cell. The cell is attached to a galvanometer which measures the amount of light passing through the sample to be analyzed.

Swatches of polyethylene film 1.5 mils thick were used as standard gauge samples by U.S.I. Care was used in handling the samples, since fingerprints on the film could cause variations as much as 10% in light transmittance.

Meters of this type are currently being evaluated by other laboratories in an A.S.T.M. round robin test.

New Polyethylene Packager Cuts Labor Costs by 50%

A west coast manufacturer recently announced a low-cost packaging machine which fills, closes and produces a finished bag in a single operation. It is designed to use bulk rolls of polyethylene film, and packages items which range in size from pencils to shirts.

The machine is said to cut packaging labor costs up to 50% through speed and efficiency of operation. The unit eliminates time-consuming hand loading of pre-manufactured bags. It reportedly eliminates set-up time, since no adjustment is necessary when changing from large to small size bags.

It is also reported that the machine can be operated by personnel who have no previous training or experience in packaging.

Now... Disposable Boots of Clear Polyethylene!

Low in cost, but high in protection are features claimed for newly introduced clear polyethylene boots. These disposable boots are easily pulled over regular shoes, and can be worn open at the top or closed with a rubber band.

Uses suggested for these inexpensive boots include biological and atomic laboratories where control of contaminated elements is vital.

The manufacturer currently packages his product in rolls of 50 and 100, and says average cost is less than 14¢ per pair. The boots are watertight, and last for several hours before wearing through, it is claimed.

Polyethylene Pipe Solves Difficult Tamping Job

Polyethylene pipe has been put to an interesting use in blasting operations for a new Potomac River water treatment plant near Washington, D. C.

A total of 62 holes were drilled to prepare a 110 ft. high cliff for blasting. Fourteen of these holes were from 35 to 96 feet deep and drilled at an angle of 32°. Since the density of the rock formation varied, there was a chance that the bore holes would swing out of line by several feet. Of major concern was the problem of loading and tamping blasting charges to the required depth in the crooked holes. Conventional, non-flexible, metal rods quite obviously would not do the job.

The blasting contractor solved the problem by using 1½" intermediate density hollow polyethylene water pipe. The highly flexible polyethylene tamping "pole" was made up of several sections of pipe.

It easily took the bends in the holes and was used successfully to tamp all required blasting caps and powdered charges in place.

DO YOU HAVE a new polyethylene packaging development you'd like the industry to know about? Make it routine to send your information on new developments to U.S.I. POLYETHYLENE NEWS.

Address the Editor,
U.S.I. POLYETHYLENE NEWS, U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corp., 99 Park Avenue, New York 16, N.Y.

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TABLE I

Summary Of Test Results

Average Number Of Drops To Failure

Bag Type Average Drop Value	Test I		Test II		Test III		All Three Tests Packs A + B
	Pack A	Pack B	Pack A	Pack B	Pack A	Pack B	
A, actual...	16.75	17.65	14.70	16.30	13.60	27.35	17.73
A, coded...	3.75	4.65	1.70	3.30	0.60	14.35	4.73
B, actual....	16.30	24.05	13.05	15.20	35.60	43.25	24.58
B, coded....	3.30	11.05	0.05	2.20	22.60	30.25	11.58
Averages A + B:							
Actual.....	16.53	20.85	13.88	15.75	24.60	35.30	21.15
Coded.....	3.53	7.85	0.88	2.75	11.60	22.30	8.15

TABLE II

Analysis Of Variance

All Test Methods — All Bag Types — All Pack Variations

Source Of Variation	Sum Of Squares	Degrees Of Freedom	Mean Square
Total.....	46,615	239	.....
Test Type.....	9,893	2	4,946
Bag Type.....	2,815	1	2,815
Pack Type.....	1,904	1	1,904
Bag x Test	4,582	2	2,291
Test x Pack.....	830	2	415
Pack x Bag.....	3	1	3
Test x Bag x Pack	419	2	210
Residual.....	26,168	228	115

F (2, 2, 0.05) = 19.00

TABLE III

Analysis Of Variance For Pack Type A

All Test Methods — All Bag Types

Source Of Variation	Sum Of Squares	Degrees Of Freedom	Mean Square
Total.....	14,755	119	.....
Test Type.....	2,497	2	1,249
Bag Type.....	1,320	1	1,320
Text x Bag.....	3,549	2	1,775
Residual.....	7,389	114	65

F (2, 2, 0.05) = 19.00

TABLE IV

Analysis Of Variance For Pack Type B

All Test Methods — All Bag Types

Source Of Variation	Sum Of Squares	Degrees Of Freedom	Mean Square
Total.....	29,656	119	.....
Test Type.....	8,227	2	4,114
Bag Type.....	1,498	1	1,498
Text x Bag.....	1,452	2	726
Residual.....	18,779	114	165

F (2, 2, 0.05) = 19.00

has been developed concerning the test or evaluation of such bags. Previous work gives no indication whether the test procedure used can be related directly to transportation losses or whether the test used can actually distinguish between bags of different constructions.

It is a well-established fact that almost every user and producer of multiwall shipping sacks has developed some sort of test which yields a certain amount of information. American Society for Testing Materials *(2)* has, in fact, outlined a definite drop-test procedure for multiwall bags. But, to test a series of bags under any given drop-test procedure and obtain an average value is relatively meaningless unless that value can relate *directly* to a shipping loss experience or can be used to show a noteworthy difference between bags made with different strength materials.

It is believed desirable, therefore, to find out whether a direct relationship exists between drop test or paper test and shipping loss experience. For the type of bag evaluated, this was well demonstrated in the work of Allen and Paine *(1)*, and would be what the writer would consider the ultimate goal in the search for a suitable test for multiwall paper shipping sacks.

Since no data on shipping tests have been published and no data exist to show that any test presently used gives valid results, this investigation was undertaken to find one or more valid test techniques for the multiwall shipping sack.

Experimental Procedure

Details of materials tested and procedures used will be found in condensed form in Chart I.

In the left hand column, under the heading "Materials," is shown the test load used, size of sample, varieties of bags used (paper bags with and without the inner textile bag constitute the two pack styles), and details on bag closures. In the right hand column are details on

the test method, definition of the point of failure, and the three test types examined.

Analysis Of Test Data

Drop test results. Consolidation of the test data into a single table giving the average values for all test variables was considered to be the first step in an efficient analysis of the data. Table I contains the summation of all test variables, and lists the three test types, two types of bags, and two pack varieties.

These have all been described in detail in the section on experimental procedure. In the statistical analyses made, previously reported techniques and procedures *(4, 5, 7)* have been used. Tables II through VI summarize the statistical analyses of these data.

Analysis Of Variance

An analysis of variance was carried out on the test results and it was found that the large mean square pertaining to the interaction bag x test was so large that none of the test averages showed significance. On examining the material further, it was seen that the variances could not be pooled to form an error term and hence the analysis of variance could not be used for testing significant differences between averages (see Table II).

Since the interaction of bag style x test type was of such a magnitude, all other interactions and the residual were discarded and the value of the mean square of this interaction was used as the error term for calculation of the *F* value. Using this interaction mean square as the error term resulted in finding no significance between any of the averages of the main effects; namely, test type, bag style, or pack type.

While the results were not significant, the *trend* of the analysis indicated that, of the three main effects, the test type was of most importance followed by the bag style and finally by the pack variety. The three other interactions were of no significance and are not worth mentioning, while the interaction used for the error term indicates that, for reasons unknown, each bag variety reacts differently toward each test type.

Although significance was not obtained in the analysis of variance on all test data, it seemed probable that division of the data by pack type might yield interesting results. Accordingly, this separation was made (see Tables III and IV). It is readily apparent that with pack Type A the interaction of bag x test is so large that it completely overshadows the main effects. Hence, no significance between various averages was obtained from the test results for all combinations of bag style with test type.

With pack Type B, we again have a large interaction, so large in fact that it will become the error term, and as a result, we again have no significant differences between the various averages. However, the main effects are of much greater magnitude for pack Type B than they were for pack Type A.

(Turn page)

TABLE V

Comparisons Between Variance Of The Means For Pack Type B And Both Bag Styles

Statistic	Test Type I	Test Type II	Test Type III
Mean number of drops to failure*	20.85	15.75	35.50
Coded mean value	7.85	2.75	22.30
Variance	117.77	54.95	384.41
Standard deviation	10.86	7.41	19.60
Standard deviation of the mean	1.71	1.17	3.10
Number of replicates	40	40	40

*Average number of drops to failure without regard to the cycle used. Cycle was a function of the test type.

Comparison Tests	As Calculated *t*-Score	As Calculated *F*-Value
Test Type I and II	2.46	2.14
Test Type I and III	4.08	3.26
Test Type II and III	5.90	7.00

F (39, 39, 0.01) = 2.11 t (0.01, 78) = 2.36

TABLE VI

Comparisons Between Variance Of The Means For Pack Type A And Both Bag Styles

Statistic	Test Type I	Test Type II	Test Type III
Mean number of drops to failure*	16.53	13.88	24.60
Coded mean value	3.53	0.88	11.60
Variance	51.00	45.28	218.00
Standard deviation	7.14	6.73	14.76
Standard deviation of the mean	1.29	1.06	2.33
Number of replicates	40	40	40

*Average number of drops to failure without regard to the cycle used. Cycle was a function of the test type.

Comparison Tests	As Calculated *t*-Score	As Calculated *F*-Value
Test Type I and II	1.71	1.12
Test Type I and III	3.11	4.26
Test Type II and III	4.18	4.82

F (39, 39, 0.05) = 1.69 t (0.05, 78) = 1.66
F (39, 39, 0.01) = 2.11 t (0.01, 78) = 2.36

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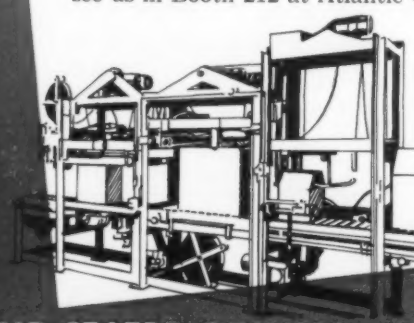

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3M COMPANY

MID-STATES GUMMED PAPER DIVISION
MINNESOTA MINING & MANUFACTURING COMPANY
Dept. 321, 6850 So. Harlem Ave., Bedford Park (Argo P.O.), Ill.

Compare Variances

Only one technique remained to be checked. The results obtained with pack Type A have been shown to yield no significant differences between the mean square of the three variables examined by analysis of variance. Evaluation of pack Type B seemed to show promise. It was therefore decided to compare the variances for each of the different test types for this pack variety. These data are presented in Table V.

The variances for each test type were compared with each other in order to test the null hypothesis that all test results were really from the same universe of test results. Accordingly, F values were calculated, which, upon comparison to standard tables, show significant differences between the three test type variances; that is, test results for each test type were different at the 1-per cent level. The same type of analysis was carried out for pack Type A and similar results were obtained. These results are shown in Table VI.

Determine "t" Values

On examining the data in detail, it was found that the coded averages 22.30, 2.75, and 7.85 were so different that there appeared to be a significant difference between the highest average and the lowest average and perhaps between the highest average and the next to the highest average. A t-test was determined, comparing the highest average with the lowest average where the variances were not the same, and it was found that the highest average was significantly different at the 1-per cent level from the lowest average.

It was found by a similar test that the highest average 22.30 was significantly larger than the next to the lowest 7.85. It was also found that the next to the highest average was significantly different from the lowest average. These averages are shown in Table V together with the various t-values for the coded averages. *(Next page)*

Since the interaction was so high in the analysis of variance, no significance for the test averages could be obtained. However, there are significant differences between the cell averages as seen in Table I. In particular, the averages for Pack A and Pack B of Bag Styles A for Test III are certainly significantly different, and also for Pack A and Pack B for Bag Style B for Test I. Other differences are also apparent.

This additional statistical comparison is quite important, since information obtained from the analysis of variance would definitely tend to indicate that no significance could be attached to the pack type, and as a result, erroneous conclusions could be deduced that would be instrumental in the selection of the type of testing procedure.

Conclusions

Since all three of the tests treat the test subject differently, and none shows differences between test subjects, the choice of the test method may be left to the decision of the researcher. It is the opinion of the writer that, in view of this, Test Method II, Chart I, is to be preferred since fewer drops are required to cause failure, and the standard deviation between replicates is less than for the other test methods.

The range of test values obtained is very wide, and this attribute has been most instrumental in producing the *non-significance* to the test variables.

A sufficient number of failures occurred on the sewn seam to indicate that a definite weakness exists at that portion of sewn open-mouth bags. An improved type of closure is desirable.

As a result of the experimental data obtained, it is apparent that the test methods used were not sensitive enough to detect the differences in bag construction of the bag varieties used. It is the belief of the writer that additional investigation, specifically, by repetition of the experimental procedures with a test subject of different construction, namely, 60-90AL-60-60-WS, would be of a definite use. Then, with these new data, and using half of the previous information (data obtained using the 6-ply bag), if it is not possible statistically to find a positive significance between bag styles having such gross differences, all three methods of drop testing are most insensitive and should be discarded.

Literature Cited

(1) Allen, R. J. L. and Paine, F. A., "Transport trials and laboratory tests on food containers, 1 — lined kraft paper bags," *Journal of Science of Food & Agriculture*, **2** (1951), No. 5 (May), p. 208.

(2) *ASTM Standards on Paper and Paper Products and Shipping Containers* (Philadelphia: American Society for Testing Materials, 1955).

(3) Couch, R. de S. and Muldoon, T. J., "Impact-fatigue test for paper," *Modern Packaging*, **24** (1950), No. 4 (Dec.).

(4) Dixon, W. J. and Massey, F. J., *Introduction to Statistical Analysis* (New York: McGraw-Hill Book Co., Inc., 1957).

(5) Goulden, C. H., *Methods of Statistical Analysis* (New York: John Wiley & Sons, Inc., 1956).

(6) *Statistical Abstract for 1958*, (Washington: U.S. Govt. Printing Of-

(Continued on Page 124)

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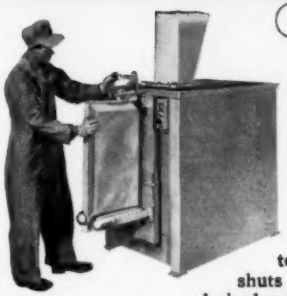

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Here is the second part of Mr. Major's two-part article on package development. Continuing with its various functions, he discusses the value of using appropriate tests, the basis on which to make decisions, and the role specifications play in the all-important program.

Package development pays off!

By Bernard F. Major,

Manager, Packaging Laboratory and Receiving and Stores Division, Ortho Pharmaceutical Corporation, Raritan, New Jersey

In the first part of our discussion on package development, we point out its definite mission and function, going into what it involves and why. The next step is knowing what packaging materials are available and what they will do.

Know Fabricating

A package development group should be familiar with all fabricating processes in commercial use. The well-equipped laboratory maintains files of catalogs illustrating the variety of processes and design possibilities in each basic type of manufacture. In addition to the catalog file, you need a generous storage area to house a reasonably broad line of sample packages and materials. If your collection covers differences in types, styles, sizes, prices, and availability, you will save a great deal of time by this visual, idea-stimulating collection. This method is helpful also for outer packaging, devices, and shipping containers as well as for the "intimate," or unit, container.

To help you still further in evaluating the packaging that is available, there is a form similar to that shown in Fig. 3. By evaluating the packaging presently on the market for similar types of products, you can facilitate making a decision to meet, improve upon, or introduce, some wholly new packaging concept.

A review of present packaging adaptable to the new product will show you areas where use of standard components is possible. It will also indicate to a limited extent the production equipment available.

See What Is Available

After surveying packages on the market, and comparing them to your present packaging, the sales promotion and package development people will be able to review the types and styles of packages in your sample storage area. Also, they can scrutinize catalogs and files, and list as alternatives those packages that appear to hold the greatest advantages.

The package development people know which basic packaging materials can satisfy the requirements of the product. The first four columns of the form shown in Fig. 3 should then be filled out in collaboration with sales promotion. This will show the material, style, dimension, and finish to be used. Clear definitions at this stage can save a great deal of time and expense by avoiding possible misunderstandings later on.

The form might indicate something like the following:

Material	Style	Dimension	Finish
Type III flint glass	Boston Round	8-oz.	38-400
	— or —		
Cello-phane	Envelope	1½x3 in.	Printed 2-colors

The above type of information is necessary for obtaining prices, determining equipment and labor costs, and eventually obtaining proper samples for testing.

Use Of Worksheet

The worksheet shown in Fig. 3 is arbitrarily limited to a few alternative packages. Many alternatives may have received consideration initially, and these should be indicated on additional worksheets attached to the final one. But you should record on the final evaluation form only those components you actually expect to test.

Piece prices and mold costs are important considerations to both package development and purchasing. After deciding on the material, style, dimension, finish, and initial and normal production quantities, the purchasing people can get quotations without difficulty. New equipment and labor costs are considerations for both package development and production.

In case the packaging lends itself to outside contract packaging, you should explore this avenue. Adaptability of existing equipment, use of machine or manual packaging, and the suitability of new equipment presently available also require exploring—and recording on the form.

You should finally test only the most economical packages that appear to meet all requirements, or possess advantages that justify additional cost. Also, be sure to record (in the appropriate space) any limitations, or particular advantages that were not obvious at the outset.

ALTERNATE PACKAGE EVALUATION WORKSHEET

SUBJECT_____ WORK ORDER NO._____ DEADLINE_____ CONTRACT PACKAGING_____

INITIAL PRODUCTION QUANTITY_____ EQUIPMENT AMORTIZATION POLICY_____

NORMAL MONTHLY PRODUCTION_____ PACKAGING COSTS WHICH CAN BE ENDURED (MAX.)_____

Similar Product Packaging On Market	Present Packaging Adaptable To This Product	Alt.	Material	Style	Dimension	Finish	Piece Cost	Mold Cost	Equipment Cost	Labor Cost	Test Results	Limitations Or Advantages
Intimate Container:												
		A										
		B										
		C										
		D										
Closure:												
		A										
		B										
		C										
		D										
Supplemental (Dessicant-Cushioning etc.):												
		A										
		B										
		C										
		D										

3 FOR EVALUATING PACKAGES CURRENTLY USED for similar type products, worksheet of this sort is suggested. Such review will show areas where use of standard components is possible. (Only three components are shown, but your form should include others such as: labels, shippers, circulars, etc.)

Pinning Down Tests

Tests normally performed to help predict the appropriateness of a package can be segregated into several categories as shown in Fig. 4. This diagram attempts to simulate the entire purpose and life of a package. Specific qualities, attributes, and anticipated functions shown cover those that are most commonly experienced.

You will note that any one of the specific qualities or attributes can affect each of the functions shown. For example, the thickness of a packaging film could have a significant effect on the water vapor transmission rate, sealing, puncture, tearing to open, etc.

How many of these relationships you should ultimately test depends on the experience and knowledge of your package development group, the time and funds the company is willing to allocate to the project, and the importance of the specific relationships.

Normal practice is to select and test first the unit, or "intimate," container. Following this step is the selection and testing of the following:

1. The closure;
2. Applicator or dispensing device;
3. Protective packaging;
4. Display outer packaging;
5. Labels and circulars;
6. Shipping containers.

Normally there is never enough time to develop more than a limited few, let alone all the possible, components when on a packaging development project.

Basis For Decision

You must obtain samples of the proposed components in the proper design, material, and size; but if this is not possible, you must use the available test results. This leads to a calculated decision. Except for commercial stock items, you will need to spell out in detail exactly what you want before a supplier can give you the material you need for testing.

This may require a specification sheet, drawing, model, or detailed discussion with the supplier. Whenever samples are obtained, it is wise to have cost data on them at the same time. Depending on the stage of the development, these cost data can be merely estimates, or approximate, or actual, quotations.

With the test results and the previous information available, the package development group can choose the package components in collaboration with sales promotion—package development covering those technical requirements shown in Fig. 4 and sales promotion covering the marketing aspects (advertising, promotion, and sales).

Completing Details

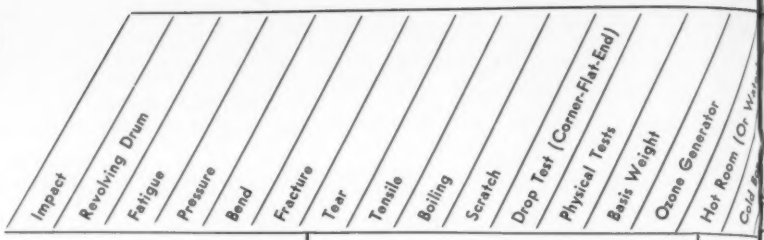
The sales promotion people may determine original label copy, usually in conjunction with product research (and perhaps a designer where art work is involved). The package development laboratory becomes involved as this work develops into finished art work, copy or color proofs, die sheets, or final drawings. All these are proof-read by the package development laboratory and checked for size, color, location of printing, and quality of workmanship.

The laboratory then proceeds to obtain the necessary approvals that may involve sales promotion, export, legal, production, and traffic. The package development laboratory and the sales promotion group each keeps an approved copy of proofs, die sheets, and drawings. One approved copy usually goes to the supplier.

Writing Specifications

When you get final approval for sample packages, die sheets, proofs, etc., then you prepare your tenta-

Volumes of tests and measuring methods are available to determine specific qualities and attributes of materials and packages.



The qualities and attributes of a package broken down to four separable aspects. Wherever stated, the package includes:

- Intimate container
- Closure
- Dispensing devices
- Supplementary attachments and literature
- Outer display packaging
- Protective packaging

Permeation
Tear resistance
Clarity
Puncture resistance
Flexibility
Toxicity
Moisture content
Distortion point
Fracture point
Melt point
Ozone deterioration
Volatility of components
Grain

Caliper
Coverage
Capacity
Linear measure

MATERIAL

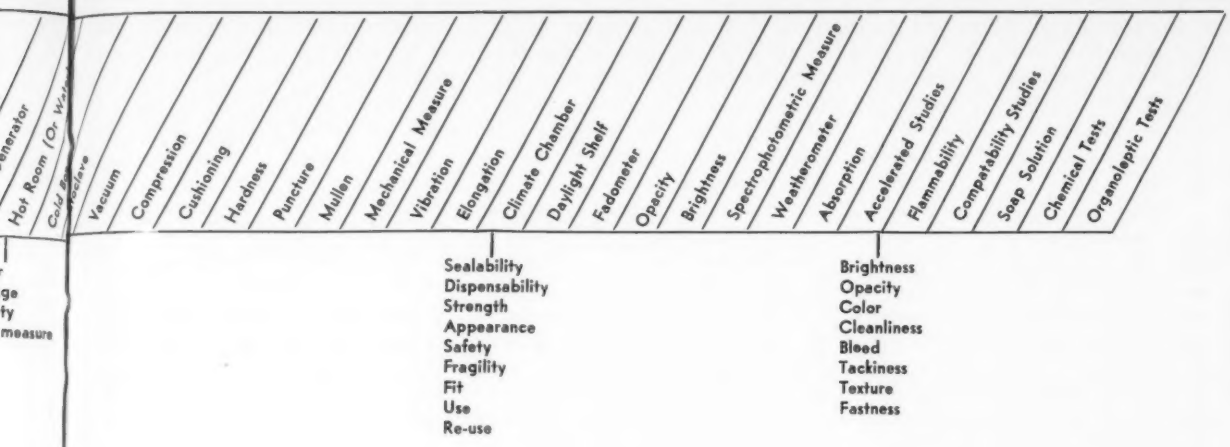
DIMENSIO

There may be a relationship between any package quality or attribute shown above and any material or condition indicated in the activities shown here →

Recognition and consideration of the specific aspects shown on this sheet will assure a trouble-free package in 99 per cent of the developments. The terms used are in their broader sense and can be further defined to suit your specific situations

Product			Production Methods And Equipm		
Chemical Structure	Sterility Toxicity Potency		Methods:		
	Aroma / Flavor	Acidity Oxidation Moisture	Sterile Pack	Steam Heat Chemical Gas Cold	
	Ozone Deterioration Dimension Specific Gravity		Gas Pack	Nitrogen Carbon Dioxide	
Physical Structure	Hardness Viscosity Melt Point Freeze Point Distortion Point Fragility		Vacuum Pack	Steam Vacuum	
	Color	Turbidity Precipitate Clarity	Aerosol Pack	Air Nitrous Oxide Carbon Dioxide Liquid Gases	
			Equipment:		
			Weighing Counting Forming Cleaning Unscrambling Closing Labeling Loading Attaching	Size Shape Opening Flexibility Grain Finish Strength Speed Tolerances Accuracy Standardization Chemical Reaction Physical Reaction Foreign Matter	

4 PREDICTING PACKAGE PERFORMANCE can be aided by many tests segregated into several categories. Note simulation of entire purpose and life of package. Any of specific qualities can affect each function shown.


Vacuum
Compression
Cushioning
Hardness
Puncture
Mullen
Mechanical Measure
Vibration
Elongation
Climate Chamber
Daylight Shelf
Fadometer
Opacity
Brightness
Spectrophotometric Measure
Weatherometer
Absorption
Accelerated Studies
Flammability
Compatability Studies
Soap Solution
Chemical Tests
Organoleptic Tests
Sealability
Dispensability
Strength
Appearance
Safety
Fragility
Fit
Use
Re-use
Brightness
Opacity
Color
Cleanliness
Blood
Tackiness
Texture
Fastness
DESIGN
FINISH
THE PACKAGE
Storage Conditions And Time
Nitrogen
Oxygen
Carbon Dioxide
Hydrogen
Ozone
Mold
Internally
Externally
Change
Topography
Altitude
Controlled Conditioning
Uncontrolled Surroundings
Tropic
Temperate
Polar
Oven
Heated
Cool
Refrigerated
Deep Freeze
Direct Sunlight
Normal Daylight
Fluorescent
Incandescent
Artificial Daylight
X-Ray (Inspection)
Time is the important constant by which
ct of all other variables can be measured.
Shipping Methods
Means
Rail (CL)
Rail (LCL)
Freight
Air
Ship
Express
Parcel Post
Truck
Handling
Drop
Impact
Vibration
Centrifical Force
Regulations (Classifications)
Parcel Post
Air Cargo
Motor Carrier
Official Express
Uniform Freight
Consolidated Freight
Package And Product In Use
Material
Strength
Wear
Soilage
Corrosion
Bacteria
Size
Weight
Style
Grip
Store
Carry
Stand
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Sharpness
Squeeze
Pilfer
Sift
Break
Opening
Open
Reseal
Remove
Tear
Finish
Appearance
Transparency
Color
Feel
Dispensing
Ease
Accuracy
Neatness
Simplicity
Disposability
Re-use
Carrier
Life of Unit

(Turn page)

tive specifications. These are for the purchasing people to use for the initial order. Other internal operating forms also need preparation at this time. Usually the new package receives some sort of code number.

Change authorization forms and a component parts list come next. These two forms are necessary to enable all other interested departments to determine their subsequent action. After the first receipt of the packages or components, unless there is some cause for further changes, the tentative specifications then become final specifications.* These then go to our affiliates for their information and possible future use.

Make Inspections

The package development laboratory inspects and tests each new component on first receipt to determine the validity of the tentative specifications governing this first purchase. If it contains a quality or attribute that is not within specifications, the shipment is re-evaluated or performance-checked on actual equipment. It is well to establish the tentative specification conservatively, though it is binding on the supplier.

Then, if the variations received do not cause difficulty and do not detract from the function or quality of the package, we can modify the tentative specification and accept the materials received.† Following this action, a report goes to all concerned. *Always* follow the first production use of a new component through production and shipping to make certain that performance is satisfactory.

The package development laboratory periodically inspects goods in the field by routine surveys of retailer and wholesaler stocks. Returned goods also receive evaluation for the condition of the packaging—regardless of the reason for the return.

Conclusion

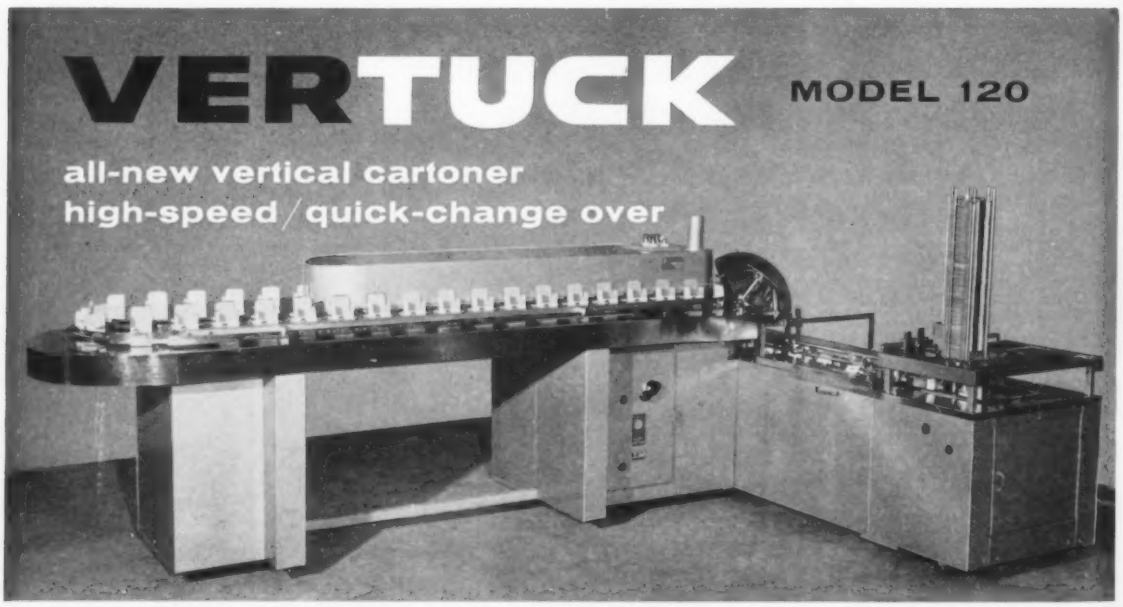
With a package development laboratory it is possible: (1) to centralize package information (files, library, patents, ideas, samples, data, etc.); (2) to review, develop, and make package changes in an orderly and professional manner; (3) to reduce costs and time required to perform these functions through the benefit of specialization.

The objective of package development is to give the customer an attractive, functional, and convenient package, consistent in quality and at a reasonable cost. For our company, we seek progress and the continuation of our competitive position in the field of medicine.

(End)

*Editor's note: In his article, "Setting specifications for package components" (PACKAGE ENGINEERING, 4 [1959], No. 6 [June], p. 33), Mr. Major sets forth a six-step program for setting up specifications for a complete line of packaging items.

†Editor's note: Mr. Major, in his article, "Establishing the quality control of packaging components" (PACKAGE ENGINEERING, 4 [1959], No. 10 [October], p. 56), discusses this concept of checking package component performance, etc., and modifying specifications.



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American Management Association is holding its 29th National Packaging Exposition at Convention Hall, Atlantic City, April 4-7. Some 335 exhibitors are using more than 140,000 sq. ft. of floor space to show or offer their packaging machinery and equipment, materials, supplies, and services to an expected attendance of more than 25,000 visitors. The show will be open for a total of 33 hours as follows:

Monday, April 4th,
10:00 a.m. to 6:00 p.m.
Tuesday, April 5th,
10:00 a.m. to 9:00 p.m.
Wednesday, April 6th,
10:00 a.m. to 6:00 p.m.
Thursday, April 7th,
10:00 a.m. to 4:00 p.m.

The registration fee is $2.00 per person and the show is open to anyone with a business connection. Alternating between the East and the Midwest, AMA says that the 1961 show will be held at the new lakeside exhibit hall in Chicago.

Following is a booth by booth review of companies able to forward their exhibit details in time for publication:

A-B-C Packaging Machine Corp.
Booth: 550 Hotel: Crillon
Exhibiting its Model XSA automatic top and bottom short case sealer and semiautomatic case packer.

Acme Steel Co.
Booth: 565 Hotel: Ritz-Carlton
Its products division exhibiting steel strapping stools, power strapping machines and accessories, and wire stitching machines for stitching bags and cartons. Its fabricated materials division exhibiting for the first time its slotted angle, a cold-reduced galvanized framing material.

Addressograph-Multigraph Corp.
Booth: 650-52-54
Exhibiting its label imprinting, carton imprinting, general duplicating and order-invoice writing equipment, the latter having automatic sequence control.

Adjusto Equipment Co.
Booth: 117 Hotel: Sun 'n Sand Motel
Exhibiting 32 models of its chairs and stools including its swing bracket pogo stool that swings clear of floor.

Algene Marking Equipment Co.
Booth: 126
Exhibiting its flat box printer and its four-way printer which imprints one, two, three or four sides of a carton in the set-up stage. *(Turn page)*

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get the convenience and economy of
ELLISCO SEAMLESS CANS

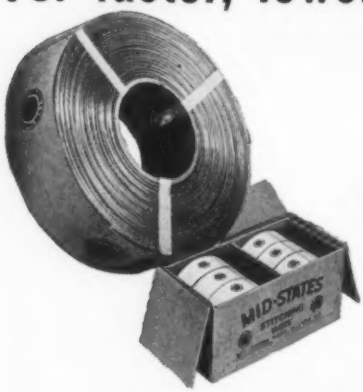
These cans are: light in weight to lower your shipping costs; made of one piece to prevent loss of your product; unbreakable for complete product protection. They are made for storing, shipping, sampling, packaging special parts, and many other industrial uses. Available in capacities from 1/16 oz. to 16 oz. plain or with LabelStik covers for identifying contents:
Flat, from 1 3/16" dia. x 1/4" deep to 5 1/2" dia. x 1 1/4" deep.
Deep, from 1 1/16" dia. x 5/16" deep to 4" dia. x 2 1/16" deep.
Most standard sizes carried in stock. Many special sizes made to order. We also invite inquiries for small stampings, parts and assemblies.

Style 10. Flat, Gold Lacquered. LabelStik Cover.
Style 63. Flanged Edge, Compound-Lined Top for Hermetic Sealing.
Style 66. Screw Top

Ellisco Write, wire or call for more details and Bulletin 116.
GEORGE D. ELLIS & SONS, INC.
Dept. M 1
American & Luzerne Sts.
Philadelphia 40, Pa.

Square and Rectangular Double-Seamed Cans. 33 Base Sizes.

For faster, lower cost production and packaging...



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gives you frictionless, uniformly smooth flow off the coil and through the stitching head to assure high-speed, uninterrupted operation. Available in 5, 10, 25 and 50 lb. coils. All standard gauges. Special gauges on request. Galvanized and copper-coated finishes.

MID-STATES Stitching and Tying Machines

A complete line of cost-savers to serve every packaging requirement. Write today for further details and prices.

MID-STATES STEEL & WIRE COMPANY
CRAWFORDSVILLE, INDIANA • JACKSONVILLE, FLORIDA

Aluminum Co. of America
Booth: 111 **Hotel: Americana**
Exhibiting a new catsup cap, futuristic closure designs, baby food closures, aluminum cans for frozen citrus juice and aluminum unit containers.

Aluminum Foils, Inc.
Booth: 617 **Hotel: Claridge**
Exhibiting its wrought aluminum products and its materials.

American Can Co.
Booth: 246 **Hotel: Dennis**
Exhibiting representative samples of products produced by all its divisions.

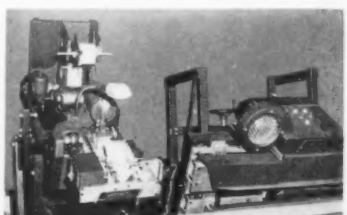
American Excelsior Corp.
Booth: 205 **Hotel: Dennis**
Exhibiting its new molded polyurethane in flexible and rigid types and applications of its Protex pads and blankets.

American Latex Fibre Corp.
Booth: 1228
Exhibiting its rubberized curled hair, rubberized curled fibre packaging materials in sheets, packs and die-cut shapes.

American Partition Co.
Booth: 133 **Hotel: Claridge**
Exhibiting various types of partitions for inner packing of glass packed merchandise.

American Viscose Corp.
Booth: 420-26 **Hotel: Shelburne**
Exhibiting cellophane as used in bundling, multipacks, portion-packs, fractional packs, show-case packaging and variety packs. Also showing new film combinations and laminations using cellophane as the base.

Amsco Packaging Machinery, Inc.
Booth: 516 **Hotel: Nautilus Motel**
Exhibiting its label applicator, a device for packaging line attachment of labels to polyethylene bagged products. Also exhibiting its power jaw sealer-labeler and a combination using a Frazier materials elevator and a Frazier volumetric filler.

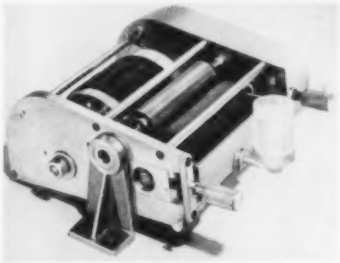


Label Applicator

Anaconda Aluminum Co.
Booth: 922-24 **Hotel: Claridge**
Exhibiting details of its products and services available to users of flexible and rigid aluminum packaging.

(Next page)

Apex Machine Co.
Booth: 119
Hotel: Colony Resort Motel
Exhibiting its automatic rotary print-



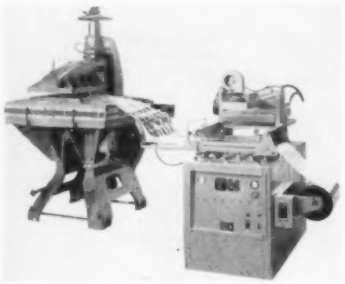
Rotary Printing Unit

ing unit to print all six sides of a package before wrapping on a wrapping or a bundling machine.

The Arabol Manufacturing Co.
Booth: 263 **Hotel: Claridge**
Exhibiting specification adhesives for production line use.

Armstrong Cork Co.
Booth: 1531
Exhibiting its new internal cushion packaging material.

Atlas Vac-Machine Corp.
Booth: 1326
Exhibiting blister forming and skin packaging equipment.



Skin Packaging Equipment

Auto-Vac Co., Div. National Tool Co.
Booth: 1408, 1412 **Hotel: Shelburne**
Exhibiting its vacuum forming process, featuring an automatic line starting with its Mark II Pressure-Vac equipment.

Avery Label Co.
Booth: 153-55 **Hotel: Shelburne**
Exhibiting its new label imprinter operating at 7,000 impressions/hr. Also showing its automatic labeler for pressure-sensitive labels and its manual and electric dispensers.

AviSun Corp.
Booth: 1101-02
Hotel: Shelburne, Empress Motel
Exhibiting details of its Olefane film and its applications. Also showing molded products produced from its polypropylene resins. *(Turn page)*

Food packagers . . .

Patapar® offers a full range of F.D.A. Accepted wrappers and liners.

All food packagers affected by the 1958 Food Additives Amendment to the Federal Food, Drug and Cosmetic Act will find it easier to achieve F.D.A. Accepted packaging by using Patapar. While Government scrutiny of food packaging grows more intense, Plain Patapar Vegetable Parchment can still offer absolute purity. *That's because there aren't any additives in Plain Patapar.* This Vegetable Parchment is a dense, fiber-free cellulose . . . whose *natural* qualities are purity, wet strength, grease and moisture resistance, good separation characteristics, and remarkable toughness. Furthermore, these qualities can be provided in varying degrees according to need.

Paterson will be glad to help you select the type Patapar which best suits your requirements. Code numbers and the corresponding characteristics of the Patapar vegetable parchments on the F.D.A. Accepted list fill up too much space to list here. If you would like specific information, simply fill out and mail the coupon for a sample package.

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For more information circle No. 246 on Reader Service Card, Page 117

HOTWATT®
CARTRIDGE HEATING UNITS
ARE THE
FASTEST ANSWER!

For fast heat-up, high-density heat, HOTWATT Precision Cartridge Heating Units are tailor-made to solve your problem. HOTWATT's unique production system offers a wide range of standard heating units . . . in diameters from ⅛" up . . . with lengths, wattage and voltage to meet your requirements.

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Low-cost ceramic-body units are also available to your design and specifications; sizes as small as 1/32" . . . lead arrangements and terminals to meet your requirements.

For fast delivery you can depend on HOTWATT. Whether you want standard or customized units . . . in short or long runs . . . HOTWATT will meet your "specs" and delivery schedule.

NEW CARTRIDGE HEATER GUIDE helps you get heat in a hurry

HOTWATT, INC.
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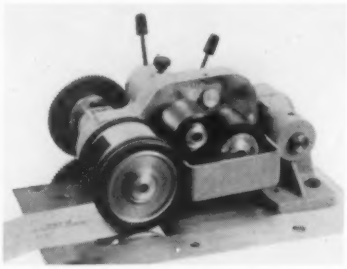
Electric Heating Specialists

Bartelt Engineering Co.
Booth: 1142, 1148 **Hotel: Claridge**
Exhibiting flexible packaging equipment and cartoning and filling equipment.

Behr-Manning Co.
Booth: 917 **Hotel: Dennis**
Exhibiting its pressure-sensitive tapes, including cellophane and colored paper-backed tapes.

Bell-Mark Corp.
Booth: 1003
Exhibiting a new printing and coding attachment with a 12-in. printing circumference, and using the flexographic press method.



Printing and Coding Unit

Bemis Bro. Bag Co.
Booth: 404-06 **Hotel: Ambassador**
Exhibiting its paper, textile, plastic and waterproof bag packaging, including automatic weighing, closing and handling machinery.

Bernardin Bottle Cap Co.
Booth: 918 **Hotel: Dennis**
Exhibiting its plastic and metal caps and nylon and Delrin aerosol bottles.

Better Packages, Inc.
Booth: 130 **Hotel: Dennis**
Exhibiting its electric automatic tape dispensers including a self-inking printer.

Biner-Ellison Machinery Co.
Booth: 211
Exhibiting its Filabelmatic filling and labeling machinery.

Bivans Corp.
Booth: 503 **Hotel: Dennis**
Exhibiting its vertical carton handling machine for setting up and closing cartons. Also showing its standard equipment.

Blocksom & Co.
Booth: 1216 **Hotel: Traymore**
Exhibiting its curled hair products in both sheet and molded form including its new molded corner pads.

Bostitch
Booth: 221, 225
Hotel: Chalfonte-Haddon Hall
Exhibiting its use of wide-crown staples for top and bottom sealing of corrugated boxes featuring an air-operated stapling head to mount in multiples for stapling full-overlapped boxes when lying on one side.

W. H. Brady Co.
Booth: 1304 **Hotel: Dennis**
Exhibiting its automatic marking machine for applying printed or die-cut pressure-sensitive labels on cylindrical areas; its dispenser for liner mounted pressure-sensitive labels, and its automatic label printer, printing and die-cutting labels at 6,600/hr.

W. Braun Co., Inc.
Booth: 527 **Hotel: Ritz-Carlton**
Exhibiting its stock and private mold glass containers and plastic bottles. Also showing its colored glass for containers and its new closures and safety caps.

The Brown-Bridge Mills, Inc.
Booth: 121-23
Hotel: Chalfonte-Haddon Hall
Exhibiting its heat-seal papers, gummed labeled papers and gummed tapes.

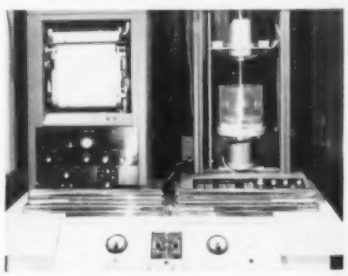
B. H. Bunn Co.
Booth: 1222
Exhibiting its tying machines including a 16-in. double-wrap manual cross tie model and 23-in. laundry model.

F. L. Burt Co.
Booth: 1316 **Hotel: Dennis**
Exhibiting two of its piston filling machines including a table model.

F. N. Burt Co., Inc.
Booth: 649
Hotel Marlborough-Blenheim
Exhibiting its multicolor lithography, process work, and reproductions of folding cartons, as well as various types of set-up boxes.

Carbert Manufacturing Co., Inc.
Booth: 1357 **Hotel: Traymore**
Exhibiting its new polyethylene bag sealing machine for produce packaging. Also showing its automatic pressure-sensitive label-imprinting applicator and its heat-sensitive label applicator.

Cel-Fibe Div., Personal Products Corp.
Booth: 1453 **Hotel: Claridge**
Exhibiting its new flame-retardant forms of bleached, moisture-absorbent wadding. Also showing other types of wadding along with demonstration of compressometer to measure "continuing bulk" of material performance.



Testing Cushioning Material

(Continued on page 88)

NIBROC® PRINT-PAK

IS THE NEW NAME OF THE "CARRIER"

...FOR PRODUCTS IN A HURRY

It was only natural for many other products to be attracted to the award-winning Nibroc White "coffee bag." Therefore, a more encompassing name was needed. Nibroc PRINT-PAK was chosen because it is so expressive of the many qualities of this whiter, brighter flexible packaging. It handles superbly on forming, filling, and closing machinery . . . and can be printed at high speed by letterpress, flex-o-graph, offset, or gravure.

Whether it is coffee, cookies, dog food, briquets, or fertilizer—Nibroc PRINT-PAK can carry your product most attractively, safely, and economically. Write for samples and complete information to Dept. KR-3

Another Quality Product of

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General Sales Offices: 150 Causeway Street, Boston 14, Mass.
Mills: Berlin and Gorham, N. H.

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PACKAGE engineering
185 North Wabash Avenue, Chicago 1, Illinois

Celanese Corp. of America
Booth: 342 **Hotel: Shelburne**
Exhibiting its line of packaging sources and materials.

Celluplastic Corp.
Booth: 1217 **Hotel: Dennis**
Exhibiting its line of plastic vials and jars and a new line of large diameter plastic semirigid containers.

The Celotex Corp.
Booth: 1153
Exhibiting its new flexible industrial fibreboard for cushioning and packaging, in thicknesses from ⅜ in. to 4 in. Also exhibiting innerpack and cushion applications of its regular and neutral pH materials.

Ralph Chaffee & Co.
Booth: 268 **Hotel: Eastbourne**
Exhibiting its heat sealing equipment, including its automatic infeed, coder-dater and hole punching unit. Also showing its machine with heat-pressure and dwell-time dials.

The Champion Paper and Fibre Co.
Booth: 1123, 1127-29
Hotel: Ritz-Carlton
Exhibiting its packaging papers and their end uses including box and gift wraps, label and envelope papers, sanitary food board and folding board.

Chanal Plastics Corp.
Booth: 1532 **Hotel: Traymore**
Exhibiting vacuum-formed plastic products including those formed from the blow molding technique.

Chase Bag Co.
Booth: 1131-35
Exhibiting its heavy-duty plastic shipping sack, stretchable paper bags and laminated textile bags.

Chase Equipment Corp.
Booth: 271 **Hotel: Dennis**
Exhibiting its automatic filling and stoppering machine, a new ampule filling and sealing machine, a powder

Sorting and Filling Machine

filling machine for small quantities, and a sterile polyethylene bottle sorting and filling machine.

Cincinnati Box & Partition Co.
Booth: 1538 **Hotel: Claridge**
Exhibiting its metal corner stay ma-

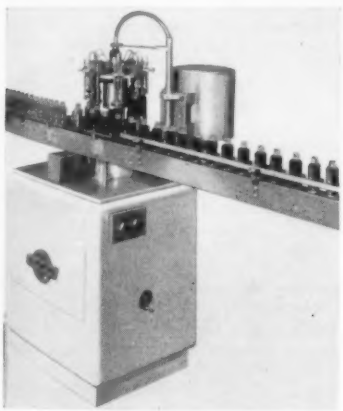
chine, metal corner stay material, box flats, assembled partitions, and color selection chart.

Claremont Pigment Dispersion Corp.
Booth: 923-25
Hotel: Chalfonte-Haddon Hall
Exhibiting its new universal alcohol reducible polyamide ink for flexographic printing.

J. L. Clark Manufacturing Co.
Booth: 908, 912
Hotel: Chalfonte-Haddon Hall
Exhibiting its line of lithographed metal containers, drawn aluminum cans with compoundeed aluminum ends, aerosol overcaps, and metal lithography.

The Cleveland Container Co.
Booth: 538 **Hotel: Ritz-Carlton**
Exhibiting its line of spiral- and convolute-wound fibre containers and transparent containers with paper, plastic and metal ends, metal-end telescope and screw-cap containers, mailing and paper tubes as well as heavy wall cores.

Climax Products Div., The Lodge & Shipley Co.
Booth: 1417 **Hotel: Shelburne**
Exhibiting its vacuum filler and an unscrambling table.



Vacuum Filler

Collapsible Tube Manufacturers Council
Booth: 1301 **Hotel: Shelburne**
Exhibiting collapsible metal tubes stressing the variety of products packaged and the functional properties of tubes.

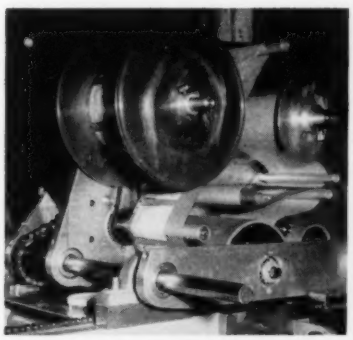
Comet Industries, Inc.
Booth: 1223 **Hotel: John's Motels**
Exhibiting its new thermoforming machine featuring automation from roll stock to finished, trimmed parts. Also showing a new automatic feeder and slitter attachment for its drape-type forming machine.

Crown Cork & Seal Co., Inc.
Booth: 254 **Hotel: Claridge**
Exhibiting samples of new container designs, lug caps and aerosol techniques.

The Daher Co., Inc.
Booth: 638 **Hotel: Ritz-Carlton**
Exhibiting its decorated and embossed metal containers, and trays.

Joseph Davis Plastics Co.
Booth: 1428-30
Exhibiting cellulose acetate sheeting, cellulose acetate butyrate, hi-impact styrene and polypropylene sheeting.

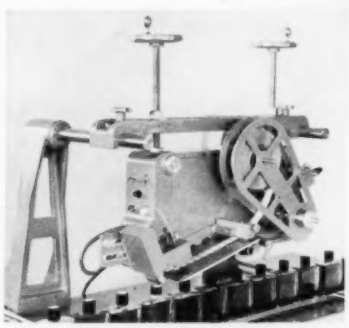
Dennison Manufacturing Co.
Booth: 534
Hotel: Marlborough-Blenheim
Exhibiting its heat transfer labeling machines, a heat seal banding machine, a hot melt adhesive applicator and a pressure-sensitive label dispenser.



Labeling Machine

Dependable Compressor & Machine Co. Inc.
Booth: 1230-32 **Hotel: Dennis**
Exhibiting its screen printing machine for round containers.

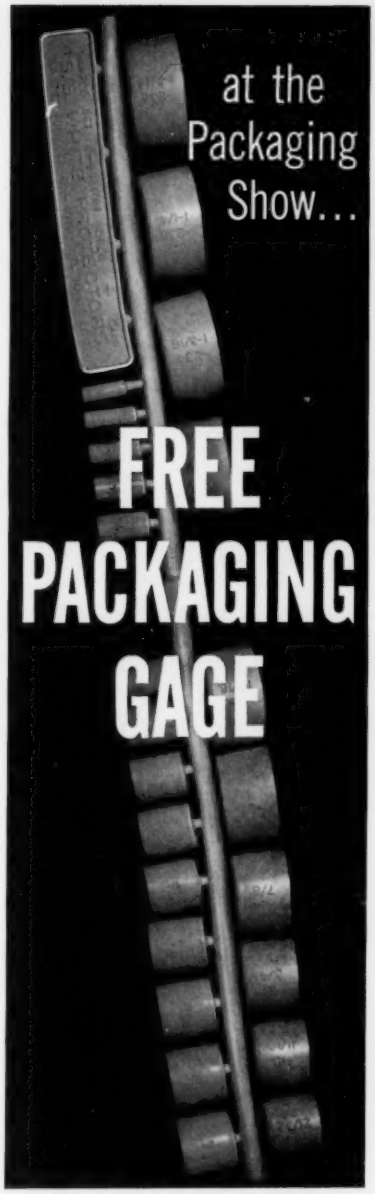
Derby Sealers, Inc.
Booth: 325 **Hotel: Shelburne**
Exhibiting its lever and electrically operated pressure-sensitive label dispensers and its automatic product labeler with a new coding attachment.



Pressure-Sensitive Labeler

Diamond Plastics Industries, Inc.
Booth: 1405-07 **Hotel: Traymore**
Exhibiting plastic packaging and plastic forming.

Dispens-A-Label Devices
Booth: 656
Exhibiting details of its label dispensers



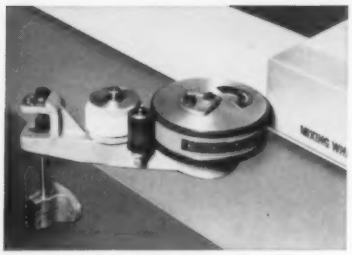
at S.S. WHITE BOOTH 1440. This free packaging gage will help you find the size plastic protector that you need for a specific part. Consists of linked samples of S. S. White Economy Line elastic vinyl caps.

Here is low cost, positive protection for your equipment during storage, processing, shipping.

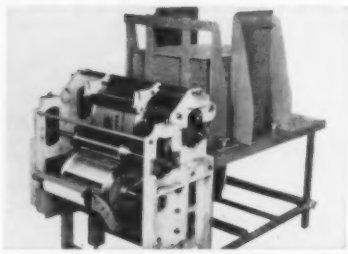
See also at Booth 1440, S. S. White *Quality Line* of rigid acetate protectors ... the ultimate in protection!

S. S. White PLASTICS DIVISION
10 East 40th Street · New York 16, N. Y.

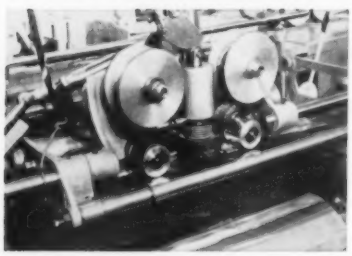
Make these IME machines your standard for comparison in marking, dating and coding equipment



WHIPPET MARKER® automates imprinting of conveyor-carried containers of all types. Driven by the conveyor and self-inking, it marks your containers as you use them. Attaches easily to any conveyor line.



#7 AUTOPRINTER® automatically imprints one or both sides of cartons and multi wall bags at speeds up to 3000 per hour. Prints clear impressions on any flat, absorbent surface regardless of minor surface variations.



RAINBOW CODER® offers you a wide color range in sharp, clear, controlled impressions on any surface that will accept hot roll leaf imprinting. Designed to be synchronized with speed of the packaging machine, it requires no operator, no ink, no makeready and very little maintenance.

Before you buy any marking or imprinting machine be sure to check on the I. M. E. line. These machines set the standards...for speed...for versatility...for rugged durability . . . for accurate, clear imprinting. You can find cheaper machines, but you can't find better dollar-for-dollar value in long-run economy and trouble-free, efficient service! Write today for our new catalog — it's yours for the asking. Department P.E.

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including its heat-activated unit for labels with delayed-tack, pre-coated thermoplastic.

The Dobeckmun Co., Div. of The Dow Chemical Co.
Booth: 435 **Hotel: Claridge**
Exhibiting its newest films in both converted and unconverted form, as well as other laminated and extruded products.

E. I. du Pont de Nemours & Co., Inc. Film Department
Booth: 464 **Hotel: Dennis**
Exhibiting packages using cellophane (both standard and polymer coated), polyethylene and polyester film. Also exhibiting cellulose bands.

Freon Division
Booth: 454 **Hotel: Shelburne**
Exhibiting its line of propellants for aerosol packages.

Polychemicals Department
Booth: 434, 438, 535, 537
Exhibiting details of its polyethylene resin as a moisture and grease barrier for coating materials such as paperboard, boxboard and kraft.

Eastern Corrugated Container Corp.
Booth: 1409 **Hotel: Traymore**
Exhibiting its corrugated containers, die-cut speciality items, prefabricated built-up pads and corner pieces, non-skid cartons, and processed and corrugated board.

Eastern Duo-Fast Corp.
Booth: 1034
Exhibiting for the first time its air nailers. Also showing its industrial stapling machines, staples and carton closers.

Eastman Kodak Co.
Booth: 556, 560 **Hotel: Dennis**
Exhibiting packages fabricated and thermoformed from its cellulose acetate, cellulouse triacetate, cellulouse acetate butyrate, and showing new uses for plastic sheet.

Ekco-Alcoa Containers Inc.
Booth: 345 **Hotel: Shelburne**
Exhibiting its line of rigid aluminum foil containers and packaging machinery. Featuring its packaging machine and universal container depositor.

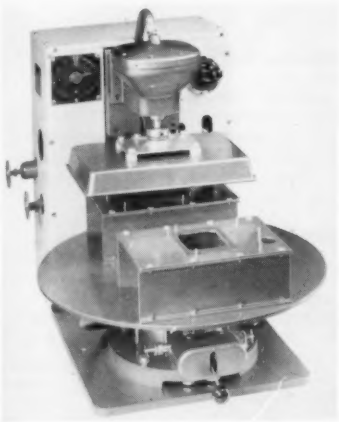
Electronic Machine Parts, Inc.
Booth: 368 **Hotel: Shelburne**
Exhibiting its photoelectric registration control equipment including new additions to its line of double differentials for bag machines and tube forming equipment.

Emhart Manufacturing Co., Portland Div.
Booth: 640-42
Hotel: Chalfonte-Haddon Hall
Exhibiting for the first time its plastic container pressure former, to feed, blank, form and deliver or stack containers made from sheet plastic material.

(Next page)

Enjay Co., Inc.
Booth: 1201 **Hotel: Traymore**
Exhibiting an overwrapping operation and showing for the first time film produced from its polypropylene.

Erdco Engineering Corp.
Booth: 1446
Hotel: Chalfonte-Haddon Hall
Exhibiting its sealers and bubble formers for bubble packaging.



Bubble Former

Errich International Corp.
Booth: 1001 Hotel: Castle Roc Motel
Exhibiting for the first time its sealer which automatically seals, trims and disposes of residue of bag. Also showing its Model 813 packager and Model 7-09 sealer.

Ertel Engineering Corp.
Booth: 901 **Hotel: Claridge**
Exhibiting its new gravity filler for cans, plastic bottles and other standard containers.

Gravity Filler

Felins Tying Machine Co.
Booth: 129 **Hotel: Ambassador**
Exhibiting its machinery for tying bundles, boxes, packages, with automatic table trip and with foot treadle trip.

Fibre Drum Manufacturers Association
Booth: 660-62 **Hotel: Claridge**
Exhibiting fibre drums from its members all over the world and used for dry, semiliquid and liquid products up to 550 lbs.

Fife Manufacturing Co.
Booth: 164 **Hotel: Madison**
Exhibiting its automatic web guiding applications.

The F. G. Findley Co.
Booth: 204 **Hotel: Saxony Motel**
Exhibiting (jointly with Southern Adhesives Corp. and Union Paste Co.) packaging and converting adhesives, including a new method of automatic case sealing.

Dave Fischbein Co.
Booth: 157 **Hotel: Dennis**
Exhibiting its bag closing equipment for filled textile and multiwall paper bags, including portable and belt conveyor machinery.

FMC, Packaging Machinery Div.
Hudson-Sharp Machine Co., Kingsbury & Davis Plant
Simplex Plant, Stokes & Smith Plant
Booth: 520, 526, 530 **Hotel: Dennis**
Exhibiting for the first time a semiautomatic machine which forms and seals acetate and styrene lids at 1,500 to 1,800/hr. Also showing its high-speed Campbell wrapper and Model 210 sideweld bag making machine.

The Walter Frank Organization
Booth: 1513 **Hotel: Claridge**
Featuring a new type screening operation for plastic containers and a display of its recent packages for drug, cosmetic, chemical and housewares use.

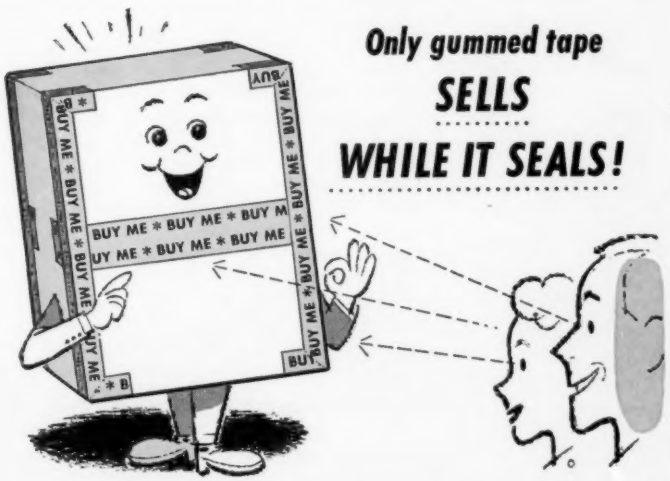
Frazier & Son
Booth: 516
Exhibiting applications of automatic conveyorized packaging systems using its materials elevators, volumetric fillers and its conveyors.

H. B. Fuller Co.
Booth: 1218 **Hotel: Traymore**
Exhibiting new adhesive products for packaging firms.

General Box Co.
Booth: 111 **Hotel: Claridge**
Exhibiting its composite wirebound and polyethylene containers, a hinge-corner wooden pallet box, a stitched panel tie-corner pallet box, and crates and shipping containers for specific applications.

General Research and Supply Co.
Booth: 1240-42 **Hotel: Ritz-Carlton**
Exhibiting its silk screen process printing press featuring printing of transparent colors on foils and regular silk screen printing on other materials.

(Turn page)



Only gummed tape
SELLS
WHILE IT SEALS!

printed tapes identify and promote your package

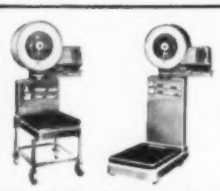
DARLING'S
Improved BONE GLUE

DARLING & COMPANY
GLUE DIVISION
4201 South Ashland Avenue, Chicago 9, Illinois
Suppliers of Animal Bone Glue to Gummed Tape Manufacturers

For more information circle No. 251 on Reader Service Card, Page 117

TOLEDO SCALES that *PRINT* Complete Weight Records for You . . .

. . . *THE ANSWER* to prevent "guesswork" and errors in cost control!



Toledo Printweigh Scales are available in a wide range of models, including Portable, Floor, and Bench types as illustrated; also Built-in, Hopper, Overhead Track and Motor Truck types.

Human errors in reading, remembering and recording weights are eliminated with Toledo Printweigh "400" Scales. They're the surest way to satisfy your requirements for weight records that are complete and indisputable.

Weights are printed in full figures, even when unit weights are used. Choice of printing on 8½" x 11" forms, or on tickets; also on strips. Weight data may be transmitted electrically for recording on remote adding or other office machines. "Memory" feature available for printing weight data, even after load is removed.

Toledo Printweigh "400" Scales give new flexibility and efficiency in weighing . . . to cut costs, guard quality, prevent profit-stealing weighing errors. Ask your Toledo representative for the full story on Printweigh Scales, or WRITE TODAY FOR BULLETIN 2017. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio
(Toledo Scale Co. of Canada, Ltd., Windsor, Ont.)

"MISFIT" SCALES MULTIPLY COSTS

Scales can become "misfits" as a result of changes in plant layout, materials handling, inventory controls, value or quantity of materials weighed. If this has happened in your plant, the results can be costly. For example: weighing errors, production bottlenecks, materials handling inefficiencies. Be sure your scales are adequate for the job. Ask your Toledo representative about a scale adequacy check in your plant, or send for the Toledo Weight Fact Kit.

SERVICE

TOLEDO® *Headquarters for Weighing Systems*

Geveke & Co., Inc.
Booth: 142
Hotel: Chalfonte-Haddon Hall
Exhibiting for the first time a Helix rotogravure press designed to print cellophane, polyethylene, papers and other packaging films and papers.

Gibbs Automatic Moulding Div., Pierce Industries
Booth: 1322 **Hotel: Shelburne**
Exhibiting its round plastic containers from 6 to 64 oz., as well as cup, pot, bowl and rectangular containers.

Glassine and Greaseproof Manufacturers Association
Booth: 104
Exhibiting end-use applications of protective papers for grease-, moisture-, aroma-, and flavor-protection, and furnishing technical consultation on behalf of member companies.

Adolph Gottscho, Inc.
Booth: 629 **Hotel: LaConcha**
Exhibiting six new package coating and imprinting machines for installation on packaging lines and units of packaging machinery. Also showing its standard package imprinting attachments.

GPE Controls, Inc.
Booth: 659 **Hotel: Shelburne**
Exhibiting its new reflected light line follower control. Also showing a web width indicator and an unwind stand-web guide using pneumatic sensing.

Reflected Light Control

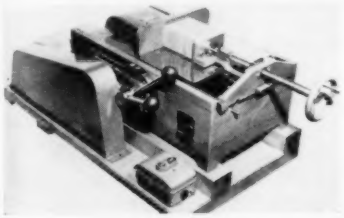
W. R. Grace & Co., Polymer Chemicals Div.
Booth: 1209, 1312 **Hotel: Dennis**
Exhibiting new items molded of high density polyethylene — film, blow-molded hollow objects, and injection-molded items.

Graphic Supply Co., Inc.
Booth: 1207
Hotel: Chalfonte-Haddon Hall
Exhibiting its newest types of printing rollers.

Graymills Corp.
Booth: 1535 **Hotel: Shelburne**
Exhibiting its agitator pumping units used in flexographic and gravure printing; also showing its viscosity control unit.

The Greif Bros. Cooperage Corp.
Booth: 1248-54 **Hotel: Claridge**
Exhibiting its standard sizes of fibre drums, having round corners and convex sides, its steel and plywood barrels and kegs, and carboys. *(Next page)*

Griffin-Rutgers, Inc.
Booth: 1516
Hotel: Chalfonte-Haddon Hall
Exhibiting for the first time a label dating and coding machine with a cod-



Coding Machine

ing capacity of 200,000 labels/hr. Also exhibiting other label dating and coding equipment.

B. J. Gump Co.
Booth: 635 **Hotel: Ambassador**
Exhibiting a weighing and packing line, automatic bag feeder, opener and weigher, net weighing equipment, drum packer and rotary sifter.

Hampton Manufacturing Co.
Booth: 1149
Exhibiting pressure-sensitive paper and cloth masking tapes, packaging tapes, printable paper tapes and tapes meeting governmental requirements, and plastic tapes.

Harris-Intertype Corp.
Booth: 1402 **Hotel: Shelburne**
Exhibiting details of Harris-Seybold offset and metal decorating presses, and its cutters; also details of Cottrell equipment and Lee flexographic presses.

Hedwin Corp.
Booth: 159
Hotel: Colony Resort Motel
Exhibiting latest models of its composite liquid containers of plastic with fibreboard overwraps or wirebound wooden overwraps. Also showing drum liners of film and molded plastic.

The Heekin Can Co.
Booth: 931 **Hotel: Claridge**
Exhibiting its lithographed cans for various products, as well as boxes and coolers.

Heinrich Equipment Corp.
Booth: 213-17 **Hotel: Traymore**
Exhibiting its polyethylene bag making machine, a 2½-in. extruder with flat film die and chill-roll take-off.

Hobbs Manufacturing Co.
Booth: 613
Exhibiting its winding and tension control, along with various models of its winders.

Allen Hollander Co., Inc.
Booth: 614-16 **Hotel: Shelburne**
Exhibiting for the first time its two-way pressure-sensitive label dispenser, handling rolls and fanfold labels in single and multiple widths.

Ideal Stencil Machine Co.
Booth: 622-24 **Hotel: Ambassador**
Exhibiting its automatic stenciling machine for marking cartons, also its cutting machines, electric and manual tape dispensing machines, hot press stenciling unit and shipping room supplies.

The Impact-O-Graph Corp.
Booth: 1324 **Hotel: Diplomat Motel**
Exhibiting four models of impact recorders including two new types of impact or shock recorders.

Impact Recorder

Intaglio Service Corp.
Booth: 208 **Hotel: Shelburne**
Exhibiting details of steps and methods in gravure process of engraving copper cylinders and flat plates, along with samples of this work.

Interchemical Corp., Printing Ink Div.
Booth: 329 **Hotel: Claridge**
Exhibiting specimens of its package printing including its new inks for corrugated board and displays for flexographic printing on plastic films.

International Eastern Co.
Booth: 1329
Hotel: Colony Resort Motel
Exhibiting machines for imprinting plastics, metal, glass, wood, and Model RG for printing on round or flat surfaces.

International Paper Co.
Booth: 1239-53, 1338-54
Hotel: Chalfonte-Haddon Hall
Exhibiting details of its manufacturing and converting processes and showing samples of its range of products.

International Staple & Machine Co.
Booth: 429
Exhibiting its range of stapling machinery, mailing machines and wire specialty products.

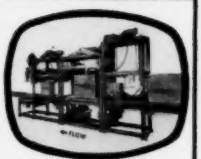
The Jackmeyer Corp.
Booth: 1522-24 **Hotel: Ritz-Carlton**
Showing for the first time its pressure-sensitive blister to apply to merchandising card without special equipment.

(Turn page)

YOU'D LIKE TAPE SEALING BEST – IF YOU HAD TO OPEN 'EM

GENERAL'S NEW SELF-SETTING CASE - SEALER TAPER FOR MIXED SIZES Is now in plant operation

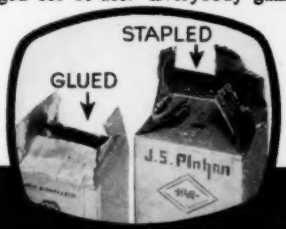
IT'S A MARVEL IN TAPE SEALING AUTOMATION



Serving in 3-M Co.'s Booth 212-30 AMA Show

These Manufacturers* use GENERAL'S CASE - SEALER - TAPER, to Tape Seal the Modern Way. Tape RIP-CORD applicator optional *Names on request

It's so easy to open without injury to persons, contents or shipping cases. Cases are more dust proof, more pilfer proof and are undamaged for re-use. Everybody gains.



These Manufacturers use the old fashioned methods

These glued or stapled cases must be torn or cut open. It's not easy, it's dangerous to persons and contents. It also wrecks the box. You don't win much customer good-will this way.

COMING SOON!
LOW COST AUTOMATIC SELF-MEASURING TAPE DISPENSER FOR RANDOM CASE SIZES

It costs to put off . . . WIndsor 4-0644

General Corrugated Machinery Co., Inc.
PALISADES PARK 17, N. J. CABLE: GENCO

Janesville Cotton Mills
Booth: 1048 **Hotel: Dennis**
Exhibiting packaging shapes made from rubberized curled hair, as well as complete packs for military and commercial shipping.

Jiffy Manufacturing Co.
Booth: 412 **Hotel: Traymore**
Exhibiting its complete line including macerated paper pads, padded shipping bags, cellulose wadding, four types of

Bag With Tear Tape

insulated bags and insulated liners, stressing new features of its shipping bag — tear tape, stretchable paper and hot-melt seam.

CUT *SHIPPING MATERIAL AND LABOR* **COSTS**

NEW!
BETTER PACK 555 - ELECTRIC

Fastest gummed tape sealer! Feather-touch key feed! 5 operations in 1 second — electrically! Selects, measures, moistens with hot water, cuts and delivers any gummed tape with effortless speed of heavy industrial shipment-sealing equipment...at a fraction of the price. Ask for Proof-Demonstration without obligation.

Better Packages, Inc. 253 Canal St Shelton, Conn.

Name_____

Company_____

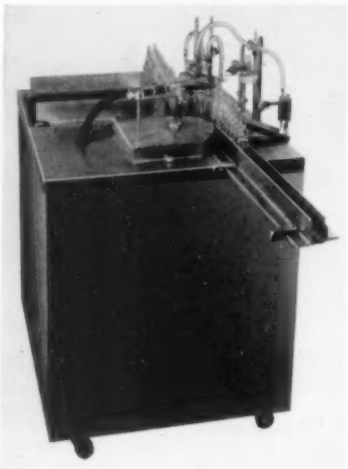
Address_____

City_____ Zone____ State____

Johns-Manville Sales Corp., Dutch Brand Div.
Booth: 1105 **Hotel: Shelburne**
Exhibiting for the first time its acetate-backed, rayon reinforced strapping tape. Also showing its acetate-backed glass reinforced strapping tape for heavy-duty commercial and industrial packaging.

Oscar I. Judelshon, Inc.
Booth: 935 **Hotel: Ritz-Carlton**
Showing for the first time its single knife cutter that slits through a roll without rewinding.

Kahlenberg Globe Equipment Co.
Booth: 103 **Hotel: Traymore**



Ampule Filler/Sealer

Exhibiting for the first time its automatic ampule feeding, filling, and sealing machine, featuring a variable speed feeder. Also showing its liquid filling machines for other types of small containers.

Kaiser Aluminum & Chemical Corp.
Booth: 1257-58, 1358 **Hotel: Dennis**
Exhibiting its aluminum foil packaging and making available its aluminum consulting team.

The Kartridg Pak Co.
Booth: 669 **Hotel: Shelburne**
Exhibiting for the first time a combination rotary pressure filler and actuator button applier. Also showing a laboratory unit, automatic straight cold-fill line and a complete semiautomatic aerosol filling line.

The Kendall Co., Polyken Sales Div.
Booth: 1246 **Hotel: Saxony Motel**
Exhibiting its industrial pressure-sensitive tapes including its cloth packaging tapes.

Keyes Fibre Co.
Booth: 1321 **Hotel: Claridge**
Exhibiting molded pulp shapes for interior contour packaging for a range of products.

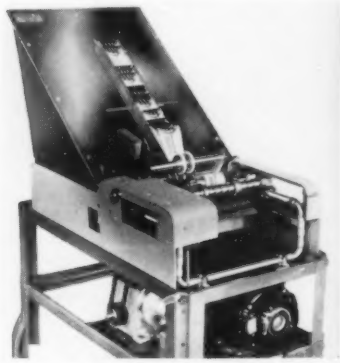
Kimberly-Clark Corp.
Booth: 351
Hotel: Chalfonte-Haddon Hall
Exhibiting its interior packaging and compressed interior packaging featuring its crepe cellulose wadding.

Kleen-Stik Products, Inc.
Booth: 663 **Hotel: Traymore**
Exhibiting its model 100 label applicator and its line of label stocks, including tamper proof labels and pressure sensitive adhesive stocks.

Koppers Co., Inc. Plastics Div.
Booth: 1104
Hotel: Marlborough-Blenheim
Exhibiting applications of its two polystyrenes (one expandable) and two polyethylenes.

Kurhan Co., Inc.
Booth: 1318
Exhibiting its fully automatic coder for all types of containers going through a packaging line. Also showing positive displacement fillers for various liquids, a volumetric filler for dry and free-flowing materials, and a cap for vacuum and pressure capping of glass tumblers, with equipment to do this.

Labelette Co.
Booth: 1215 **Hotel: Shelburne**
Exhibiting various models of its labelers including one having for the first time an electronic label feeder.



Labeling Equipment

Lassiter Corp.
Booth: 113-15 **Hotel: Claridge**
Exhibiting for the first time products of its new Print-A-Tube Div., featuring extrusion coated materials, plain and printed films, foils, and papers, and equipment for skin packaging.

LectrOmatic Devices Inc.
Booth: 1331-35 **Hotel: Runnymede**
Exhibiting its polyethylene bag makers and a pouch machine.

Leedpak, Inc.
Booth: 604-606 **Hotel: Shelburne**
Exhibiting its European packaging machinery including vacuum forming and filling equipment, code imprinters, and its high-economy tetrahedron package.

(Continued on Page 96)

why a Votator® piston filler

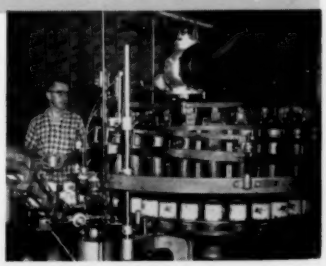
VOTATOR Reg. U.S. Pat. Off.

because no other filler can provide this overall combination of advantages.

- ☑ **ADJUSTABLE LEGS:** Production height between 29″ and 32″. . . sufficient clearance for complete cleaning all around equipment
- ☑ **FULLY ENCLOSED GEARCASE:** Completely protected gears insures permanent lubrication
- ☑ **DIRECT DRIVE TO FILLER BOWL FROM POWER SUPPLY:** Synchronization improved of filling equipment with container equipment
- ☑ **ACCESSIBILITY OF CONTAINER HANDLING PARTS:** Replacement or cleaning of parts made easy and rapid
- ☑ **RAPID LOW COST VALVE GUIDE, PORT AND ROLLER REPLACEMENT SELF-CLEANING VALVE SEATS:** Product purges valve ports and seats with each valve cycle
- ☑ **SMALLER FILLING RADIUS WITH CLOSER CONTAINER CENTERS:** Designed for greater speed of fill per station and to minimize centrifugal force effect
- ☑ **FINE MICROMETER ADJUSTMENT:** Provided for piston cam and fine adjustments can be made while unit is in operation
- ☑ **CAM TRACK LOCKING ADJUSTMENT WITH FOUR POINT SUSPENSION:** Insures greater rigidity and accuracy of fill
- ☑ **LARGER DIAMETER PISTON CAM TRACK:** Insures smoother, more accurate filling
- ☑ **MINIMUM OFFSET OF PISTON ROLLERS:** Side thrust reduced, lessens piston wear
- ☑ **LARGER DIAMETER PISTON ROLLERS AND VALVE ROLLERS:** Skid and wear minimized
- ☑ **NO DRIP:** Valves automatically seat themselves in the port with direct, positive metal to metal valve port and seat contact
- ☑ **NO-CONTAINER NO-FILL CONTROL MECHANISM**
- ☑ **WIDE VARIETY OF VALVE SIZES AVAILABLE:** For varying viscosity and product characteristics, speed and size of container

VOTATOR Fillers, production models for every need, bring to the packaging industry new and proved concepts of precision, speed and smooth, continuous, automatic product flow based on years of field and engineering experience. Machines of this type are today giving profitable, trouble-free service in a wide variety of processing plants. For detailed information, write for bulletin PED 259 today.

VOTATOR Continuous Process Equipment brings automation to processing and packaging. In many fields, VOTATOR Heat Transfer Equipment and VOTATOR Fillers, completely integrated into continuous processing systems, increase production, lower costs and improve product quality.



At this modern plant, in East Boston, Massachusetts, the VOTATOR 27-station Piston Filler is filling Lube Oils, S.A.E. #10-70, with a weight accuracy of ± 1/10 oz. per quart can.

Votator®

CONTINUOUS PROCESS EQUIPMENT & SYSTEMS

GIRDLER PROCESS EQUIPMENT DIVISION

CHEMETRON CORPORATION
Louisville 1, Kentucky

CHEMETRON

NEW YORK • CHICAGO • SAN FRANCISCO • MARIETTA, GA.

FLUIDICS* AT WORK

If you pack

GLASS
PAPER
PRE-PACK
OR
TIN CONTAINERS

... take a look at the

NEW Pfaudler 10-station filler

With its *continuous through-feed* conveyor driven from the base of the filler, the new RP-210 is ideally suited for stand-up feed of glass, paper, or pre-pack containers.

With *standard can chute* or *infeed* conveyor, the new machine handles with ease conventional tin containers.

In this 10-station rotary piston filler you have a machine that can package products that range in consistency from evaporated milk to potted meat.

You can fill at rates up to 300 per minute (depending on container size and nature of product) with accuracy to ±1/10 fluid ounce.

Standard cylinders come in three diameters—1¾" for 1 to 8 oz. container size; 2¾" for 4 to 16 oz.; and 3¾" for 8 to 38 oz. You can also get a 3¾" diameter cylinder in special design for up to 46 oz.

The through-feed conveyor provides you with a 4 foot infeed and 4 foot discharge. Standard can chute or infeed conveyors of 6 to 8 feet in length are also available.

As with all Pfaudler fillers, you get "simplicity of design" in the RP-210—leading to quick, efficient operation, thorough cleaning, and very little down time.

For complete specs ask for Bulletin 979. Write to our Pfaudler Division, Dept. PE-30 Rochester 3, N. Y. Thank you.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment, and experience in solving problems involving fluids.

PFAUDLER PERMUTIT INC.
Specialists in FLUIDICS . . . the science of fluid processes

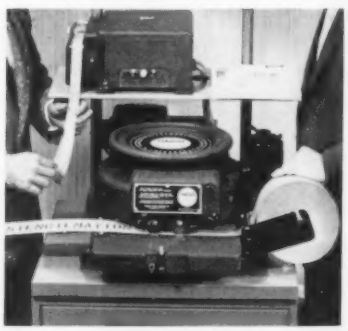
Linear Products, Inc.
Booth: 1528 **Hotel: Claridge**
Exhibiting printed pressure-sensitive tapes and labels, die-cut and butt cut. Also showing dispensing equipment for these.

Ludlow Papers, Inc.
Booth: 1017 **Hotel: Dennis**
Exhibiting soft goods and paper items wrapped automatically in its films. Also showing automatic packaging machinery.

Manhattan Adhesives Corp.
Booth: 154 **Hotel: Traymore**
Exhibiting samples of its adhesives for acetate, cellophane, polyester, polyethylene, vinyls and other plastics.

Markem Machine Co.
Booth: 621 **Hotel: Diplomat Motel**
Exhibiting its Model U-1015A machine for automatic conveyor feed, print, and removal of flat surface cosmetic cases, its Model 70B6 in-line printing components for customer mounting on conveyor, and its Cosomatic flat bed letterpress-flexographic printer.

Marsh Stencil Machine Co.
Booth: 655 **Hotel: Dennis**
Exhibiting for the first time a stencil machine to cut shipping stencils without an operator by a punch tape. Also showing its stencil cutting and electric tape machines.



Automatic Stencil Cutter

Martin Engineering Co.
Booth: 1225 **Hotel: Claridge**
Exhibiting its vibration inducers including pneumatic, electric, hydraulic, gas and steam motive types. Also showing its line of vibration accessories and mounts including a new lightweight vibrator.

Metal Edge Industries
Booth: 446 **Hotel: Claridge**
Exhibiting its custom packaging in metal edge and folding box constructions. Also showing its materials control specialties.

Mettler Instrument Corp.
Booth: 1308 **Hotel: Empress Motel**
Exhibiting its new checkweighing and sorting balance for packages or components. Also showing its automatic filling balance for dispensing powdered

or granulated materials, as well as high-speed platform scales for check-weighing and general statistical tabulation.

Checkweighing Scale

Milprint, Inc.
Booth: 229 **Hotel Claridge**
Exhibiting its line of multicolor packages including a display of packages from its 22 foreign affiliates.

Minnesota Mining and Manufacturing Co.
Booth: 212, 218, 222, 230
Hotel: Shelburne
Exhibiting its industrial tapes, polyester film ribbons, chemical products and gummed paper line. Showing for the first time a new tape to replace cellophane tapes for industrial use and a jumbo roll of filament tape.

Monroe Danford and Co.
Booth: 1557 **Hotel: Diplomat Motel**
Exhibiting fancy metal closures, containers, aerosol containers, cover caps and contact and unit packaging items.

Monsanto Chemical Co., Plastics Div.
Booth: 364
Hotel: Chalfonte-Haddon Hall
Exhibiting its line of plastics for packaging, including polystyrene, polyethylene, cellulose acetate and others — together with applications.

Moonglow Plastic Jewel Corp.
Booth: 648 **Hotel: Empress Motel**
Exhibiting its injection-molded reuse packages.

Morningstar-Paisley, Inc.
Booth: 541 **Hotel: Dennis**
Exhibiting its range of packaging application adhesives with technical consulation available.

Mosstype Corp.
Booth: 138 **Hotel: Shelburne**
Exhibiting its new rubber plate mounter-proofer machine with movable inboard bearing. Also showing its plate and cylinders, and details of printing from rubber plates and design rollers.

Mystik Adhesive Products, Inc.
Booth: 601 **Hotel: Ambassador**
Exhibiting its pressure-sensitive tapes.

National Bundle Tyer Co.
Booth: 636
Exhibiting tying machines for general purpose tying, including the use of light cotton as well as heavier fibre twines.

National Equipment Corp.
Booth: 163 **Hotel: Shelburne**
Exhibiting its automatic short case sealer, its Rose sachetti wrapping machine and its Rose kiss form, cut and wrap machine. These latter two will be shown for the first time.

National Foil Co.
Booth: 1302 **Hotel: Claridge**
Exhibiting its use of light defraction as a feature of an embossing dimension in foil.

National Packaging Corp.
Booth: 1208 **Hotel: Shelburne**
Exhibiting custom-made vacuum-formed plastic trays for packaging a variety of products.

National Paper Box Manufacturers Association
Booth: 141-43 **Hotel: Dennis**
Exhibiting set-up boxes which won prizes in its 1959 contest and handmade sample boxes designed by art students.

New Era Manufacturing Co.
Booth: 644-46 **Hotel: Empress Motel**
Exhibiting samples of work its machines produce. Also exhibiting a high-speed knotter producing 11,000 pcs./hr.

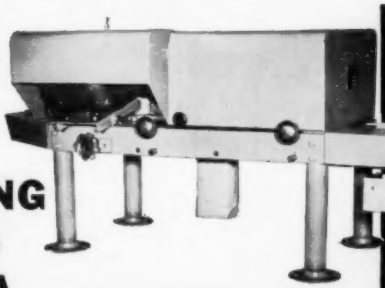
New Jersey Machine Corp.
Booth: 505 **Hotel: Dennis**
Exhibiting its new double-turret labeler for back-and-front labeling and its round-bottle spot labeler, as well as its electric-eye-controlled roll-feed labeler that applies spot labels to 150 bottles/min.

Ohio Chemical & Surgical Equipment Co., Div. of Air Reduction Co.
Booth: 1526
Hotel: Marlborough-Blenheim
Exhibiting food and non-food products in pressurized containers and showing details of use of compressed gasses in food processing.

Olin Mathieson Chemical Corp.
Booth: 1116
Exhibiting cellophane, polyethylene, folding cartons, multiwall sacks, and containers and paper products.

Oliver Machinery Co.
Booth: 637 **Hotel: Empress Motel**
Exhibiting its new rotary imprinter to imprint copy of roll-type labels and to attach to a top labeler which operates

SOLVE YOUR BAG CLOSING NEEDS WITH A...



FRY machine

Model GS-54 — Continuous motion Master Bag Closer. Heat seals, glues or both. Extra strong, sift-proof closures on plain, coated or lined paper bags.

Model CBS—Single or double folds and heat seals many heat sealable paper bags.

Model CBG—Makes flat top bag closure as for coffee bag. Automatic operation. Heat seals, folds, glues.

Tommy Tucker—Feeder for CBG. Fully automatic from filler to shipping case. Tucks gussets.

Model V-30 — Vibrating conveyor to settle product. Will feed Tommy Tucker. Adjustable lengths.

Model CSG—Sealer—gluer for automatic, square and flat paper bags. Handles to 20 lbs.

Free literature available on all Fry Machines.

PRODUCTS TESTED AND PROVEN:
- All Powder or Granulated Products
- Briquets
- Cement Paint
- Chemicals
- Cocoa
- Coffee
- Cookies
- Corn Meal
- Dog Food
- Dried Fruits
- Fertilizers
- Flour
- Grain
- Insecticides
- Milk Powder
- Mixes
- Plant Foods
- Pop Corn
- Potato Chips
- Rice
- Seed
- Sugar
- Wheat Paste

GEORGE H. FRY COMPANY

42 East Second Street, Mineola, N. Y. — Pioneer 6-6230

For more information circle No. 257 on Reader Service Card, Page 117

Good news for users of tape

Here's the latest idea in sealing cartons... the DIAL-TAPER. You dial the length of tape and the DIAL-TAPER does the rest automatically ... measures tape accurately, moistens tape with warm water and cuts off clean.

Users report "up to 50% saving in TIME, 25% saving in TAPE, plus stronger, neater package. Tape sticks tight with one pass of the hands." Used by U. S. Government, Ford, General Electric, all types of business.

For free booklet DT-5 write to Marsh Stencil Machine Company,
34 Marsh Bldg. • Belleville, Ill. T-23
Circle No. 258 on Card, Page 117

WedgLoc
CARDBOARD
PARTITIONS
PROTECT
PRODUCTS
BEST

W.J. Bradford
PAPER COMPANY
301 WEST 16TH STREET
HOLLAND, MICHIGAN
SINCE 1924

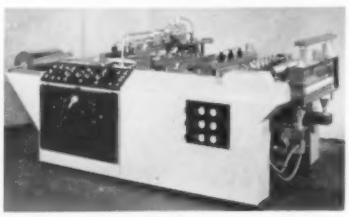
at 200/min. Also showing roll-type thermoplastic labels.

Ortman-McCain Co.
Booth: 1439 **Hotel: Shelburne**
Exhibiting its new non-skid spray equipment, non-skid coatings on box-board, liner-board, and multiwall bags. Also showing its hot wax spray units with electronic control for heat regulation and time.

Owens-Illinois Glass Co.
Booth: 234-42 **Hotel: Claridge**
Glass Container Div. exhibiting its jars, bottles, and other containers, including plastic-coated glass pressure packages. Kimble Glass Co. exhibiting its vials, parenteral drug containers, including aluminum seal vials and opal glass containers. Paper Products Div. exhibiting its range of corrugated shipping boxes including its new C-flute board.

Oxy-Dry Sprayer Corp.
Booth: 1454 **Hotel: Shelburne**
Exhibiting its anti-offset spryaing equipment.

Packaging Industries Limited, Inc.
Booth: 352 **Hotel: Ambassador**
Exhibiting its semiautomatic blister heat-sealing machine, its vacuum former machine, and a film top sealing machine for blisters.



Vacuum Former

Pack-Rite Machines, Div. of Techtmann Industries
Booth: 450 **Hotel: Tropicana Motel**
Exhibiting its sealer with ink code dating attachment and cooling pressure wing. Also showing a Holm automatic weighing and filling machine for free-flowing non-bridging products.

Pamarco Inc.
Booth: 920 **Hotel: Traymore**
Exhibiting precision rolls for printing and converting including rotogravure base cylinders, Micro-Lok plate cylinders, inking rolls, embossing rolls and gravure-engraved rolls.

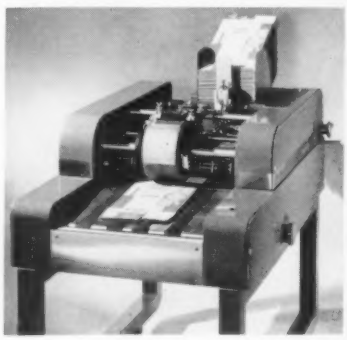
Pan Industrial Corp.
Booth: 1504, 1508
Exhibiting the Kammann equipment for printing bottles, vials, ampules of glass, plastics, or other materials. It speeds to 6,000 impressions/hr.

Permacel
Booth: 513, 517 **Hotel: Claridge**
Exhibiting its printable, reinforced, transparent tape, its polyester and cellophane tapes, as well as dispensing equipment for pressure-sensitive tapes. Also showing its colored flatback paper packaging tape.

The Pfaudler Co., Div. of Pfaudler Permutit Inc.
Booth: 653
Exhibiting a new ten-station rotary piston filler with speeds to 300/min. and featuring simplified changover.

Photomation, Inc.
Booth: 1425 **Hotel: Dennis**
Exhibiting the application of photoelectric instruments for automation in packaging.

Pitney-Bowes, Inc.
Booth: 554
Hotel: Chalfonte-Haddon Hall
Exhibiting its new packaging imprinting machine as well as its high-speed

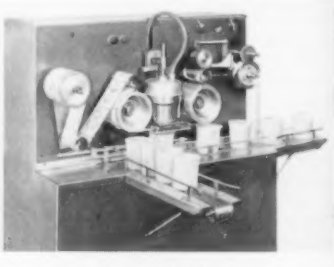


Package Imprinter

counting and imprinting unit and its folding and inserting equipment, plus its postage meters and scales.

Plast-O-Craft Co., Inc.
Booth: 1509
Exhibiting its complete line of vacuum forming machines and its Model 300 for the first time.

Plastomatic Corp.
Booth: 1418 **Hotel: Dennis**
Exhibiting a new hermetically sealed polyethylene container and equipment for sealing this in a user's plant, handling containers in 8- and 16-oz. sizes.

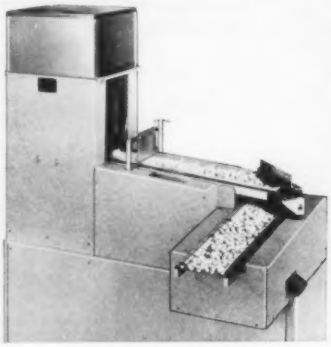


Sealing Machine

Pneuma-Flo Systems Inc.
Booth: 916 **Hotel: Empress Motel**
Exhibiting various models of its powder spray units and showing for the first time its new spray gun and its viscosity

control which controls a liquid's viscosity by automatically adding a diluent.

Popper & Sons, Inc.
Booth: 135-37
Exhibiting its high-speed liquid fillers, washing equipment, automatic plugging machines and tablet and capsule count-



Chip and Powder Remover

ing equipment. Also showing its tablet inspectors, folding box imprinters and fully automatic ampule printing machines; also showing its chip and powder removers.

Potdevin Machine Co.
Booth: 416 **Hotel: Dennis**
Exhibiting a gluing machine, label paster with semiautomatic feeder, ductor roller margin gluer, coating ma-

Hot Melt Extruder

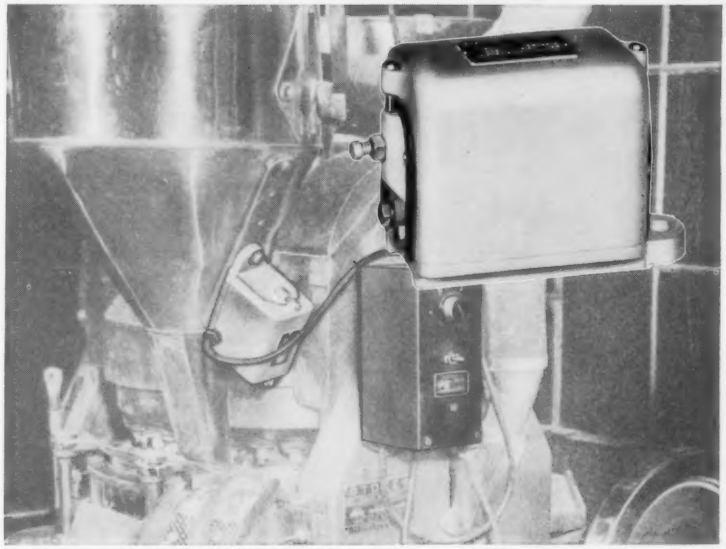
chine, label activator, topside margin gluer, hot melt seam extruder and semiautomatic labeler.

The Printing Machinery Co.
Booth: 105 **Hotel: Ambassador**
Exhibiting its label die-cutting machine, its sterling toggle base for mounting and registering on flat bed presses and its rotary hook system for mounting and registering on rotary letter presses.

Pyroxylin Products, Inc.
Booth: 1307 **Hotel: Shelburne**
Exhibiting details of lacquer and hot-melt packaging materials as adhesives, protective coatings, decorative coatings

SYNTRON cost-reducing equipment of proven dependability

keeps material flowing freely



SYNTRON Pulsating Magnet

BIN VIBRATORS

—on bins, hoppers and chutes provide an efficient, effective method of keeping bulk material (fine powders, granular or chunks) flowing freely to packaging, processing, marking, counting and other operations.

Their high speed (3600 VPM) instantly controlled vibration moves most bulk materials; positive control assures a smooth even flow; rugged construction means longer service; simplicity of design, fewer moving parts, lower maintenance.

SYNTRON Electromagnetic Bin Vibrators will make any bulk material handling operation more efficient.

Visit SYNTRON at the AMA Packaging Show Booth 1341

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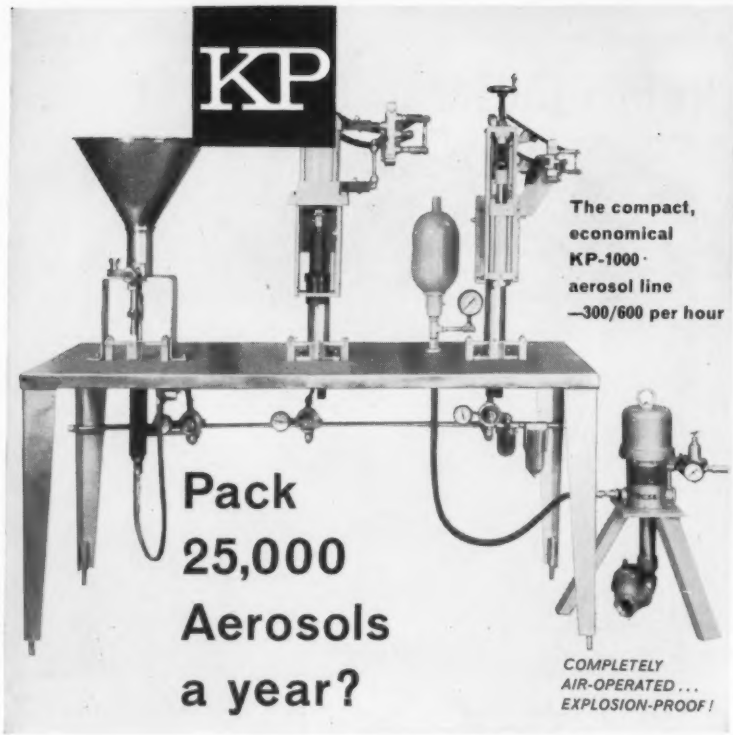
Quality Equipment Since 1941
269 Lexington Ave. Homer City, Penna.

Other SYNTRON Equipment of proven dependable Quality

HOPPER LEVEL SWITCHES

VIBRATORY FEEDERS

FLOW CONTROL VALVES


KP
The compact, economical KP-1000 aerosol line —300/600 per hour
Pack 25,000 Aerosols a year?
COMPLETELY AIR-OPERATED... EXPLOSION-PROOF!

Easy to operate, compact yet complete, the semi-automatic KP-1000 comprises a piston-type filler, a crimper, and a pressure filler. Whether or not you are packaging aerosols now, or only thinking about it, you should get the facts on this economical quality equipment.

KP-Mojonnier lines have filled—*and are now filling*—more aerosol cans than any other make of equipment. As the most experienced specialists in aerosols, Kartridg Pak offers you a single source, with undivided responsibility, for all aerosol packaging equipment. Every unit is engineered to function with the others.

For large-volume production, Kartridg Pak automatic lines have capacities up to ten million aerosols a year.

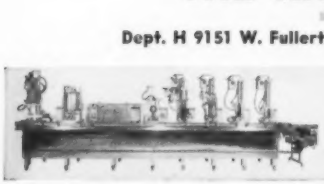
Laboratory equipment, for pre-testing your package, can be rented and the modest rental applied on the purchase.

Get all the facts fast

To have an area sales engineer call on you promptly, telephone us at Chicago, NAtional 5-8270, or write today.

THE KARTRIDG PAK CO.

Dept. H 9151 W. Fullerton Avenue Franklin Park, Illinois

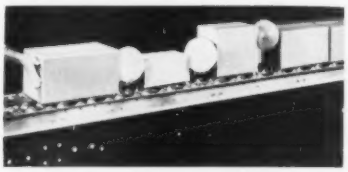


NEW "800" AUTOMATIC LINE for larger volume. Single or double track. Completely engineered throughout.

for paper, adhesives for blister packaging and special function coatings for paper and aluminum foil.

Quickpak Machinery Corp.
Booth: 618
Exhibiting its automatic polyethylene wrapping machine as well as smaller manual units and bagging machines.

The Rapids-Standard Co., Inc.
Booth: 1033 **Hotel: Traymore**
Exhibiting its adjustable pressure conveyor to permit accumulating packages of various sizes on a powered conveyor.



Adjustable Pressure Conveyor

Rheem Manufacturing Co.
Booth: 1107, 1109 **Hotel: Claridge**
Exhibiting its new pails lined by the centrifugal method.

Riegel Paper Corp.
Booth: 363 **Hotel: Shelburne**
Exhibiting its flexible packaging materials, solid bleached paperboard and specific uses of protective packaging.

Rosotti Lithograph Corp.
Booth: 269-70 **Hotel: Shelburne**
Exhibiting new structures and designs in multicolor labels and cartons.

G. T. Schjeldahl Co.
Booth: 1013 **Hotel: Dennis**
Exhibiting polethylene bag machines that make side-weld or bottom-sealed bags and attachments including continuous web perforating equipment. Also showing equipment to seal filled polystryene containers.

Seal-A-Round Corp.
Booth: 902
Exhibiting its new polyethylene packaging machine, a semiautomatic unit to seal three or four sides at one time.

Polyethylene Packager

Sealright Co., Inc.
Booth: 145-147
Hotel: Colony Resort Motel
Exhibiting its polyethylene plastic-coated Sealkan bulk container. *(Next page)*

Shopsin Paper Co.
Booth: 620 **Hotel: Shelburne**
Exhibiting a foil board treated so that it can be printed and have a blister package placed on top of the foil. Also exhibiting its line of laminated foil papers and boards suitable for printing.

Signode Steel Strapping Co.
Booth: 1016-18-20 **Hotel: Dennis**
Exhibiting its fully automatic power strapping machine, air-powered and electric-powered strapping tools, power strap feeder, steel strapping, dispensers, cutters and accessories.

The Simco Co.
Booth: 1320 **Hotel: Empress Motel**
Exhibiting static eliminators for all types of film converting and packaging

Static Locator

machinery. Also showing its electrostatic locator and an anti-static material to apply to machinery belts, etc.

Simon Adhesive Products Corp.
Booth: 1054 **Hotel: Traymore**
Exhibiting a method of manufacturing pressure-sensitive labels from roll-label stock as well as details of these labels and methods of dispensing and applying roll-type pressure-sensitive tapes. Showing for the first time its polyester tapes and vinyl polyester laminates.

Simplex Binder Co.
Booth: 1415 **Hotel: Eldorado Motel**
Exhibiting various means of using vinyl for packaging for reuse.

Sinclair and Valentine Co.
Booth: 413 **Hotel: Traymore**
Exhibiting its printing inks for packaging purposes including those for printing on polyester film, magnetic inks and offset and letterpress inks.

H. P. Smith Paper Co.
Booth: 122 **Hotel: Ambassador**
Exhibiting its polyethylene-cellophane and polyethylene-cellophane-aluminum foil and other transparent coated packaging materials along with polyethylene coated paper, pouch stocks and government barrier materials.

Soabar Co.
Booth: 1204
Exhibiting its new label marker han-

FOR FASTER, LESS COSTLY STENCILING OR MARKING ON ANY SURFACE OR MATERIAL

Spray REYNOLDS

QUICK-DRYING—WATERPROOF

STENCIL INK

9 Colors—Each packaged in the handy, easy-to-use 12 oz. Aerosol Container

Stenciling, color coding and identification marking have now become clean, quick and easy. Container sprays a dense, compact cone of specially formulated ink at the touch of a finger. Ink is very opaque. Dries in seconds. No smear, smudge or curtaining. Not to be confused with slow drying paints, lacquers and enamels. Easy to store. Always ready to use. No cans to open; no pots or brushes to load. No drying out, no waste, no mess. Saves time. Specify Reynolds,—the original, proven best, quality ink for any marking. A trial will convince you.

Fully descriptive folder sent on request. Write today!

REYNOLDS INK, Inc.
4536 EUCLID AVE. • CLEVELAND 3, OHIO

For more information circle No. 262 on Reader Service Card, Page 117

end sticking

reduce down time

with TEMP-R-TAPE®

Temp-R-Tape eliminates sticking problems and undesirable accumulations. No materials, even those of a sticky, or viscous nature will adhere fast to its slick, wax-like TEFLON surface. Pressure-sensitive . . . it's easy to apply . . . easy to remove . . . reduces the down time involved in sprayed or baked-on Teflon surfacing. Temp-R-Tape has a useful temperature range of −100°F to 500°F. It's odorless, non-contaminating, non-absorbing and durable.

NON-STICK USES: heat sealing bars; forming plates, dies and bars; labelling rollers; chutes; hoppers; gussets; fins; guide rails.

AVAILABLE FROM STOCK: ¼" to 2" widths, 18 yd. and 36 yd. rolls and 12" widths on liner by lineal yd. Special roll widths slit to order. Sold through distributors.

FREE SAMPLE and folder — write, phone or use inquiry service.

ELECTRICAL AND INDUSTRIAL SPECIALTY TAPES

CHR CONNECTICUT HARD RUBBER CO.

*duPont TM

Main office: New Haven 9, Connecticut

For more information circle No. 263 on Reader Service Card, Page 117

dling labels up to 1x1⅞ in. and its new ticket and label marker along with marking and attaching equipment and pin-ticketing machinery.

Label Marker

Sohn Manufacturing, Inc.
Booth: 1154 Hotel: Tropicana Motel
Exhibiting its pint-size label making units and its flexographic label making equipment.

Southern Adhesives Corp.
Booth: 204 Hotel: Dennis
Exhibiting (jointly with F.G. Findley Co. and Union Paste Co.) packaging and converting adhesives, including a new method of sealing cases automatically.

Speedry Products Inc.
Booth: 112 Hotel: Ritz-Carlton
Exhibiting its marking, stapling and stenciling devices and related inks.

Spencer Chemical Co.
Booth: 1305, 1404
Hotel: Chalfonte-Haddon Hall
Exhibiting for the first time its polymorphous polyethylene as well as its nylon polypropylene films.

Standard Instrument Corp.
Booth: 1421 Hotel: Empress Motel
Exhibiting its new miniaturized photoelectric controls and its new electronic predetermining counter, working at speeds to 100/sec. Also showing its automatic control of conveyorized operations.

Standard Paper Box Machine Co., Inc.
Booth: 1558 Hotel: Ambassador
Exhibiting its metal edging machine.

Stanford Engineering Co.
Booth: 1137, 1145 Hotel: Shelburne
Exhibiting its web guides, doctor machines, slitters, and turret rewind and unwind equipment.

Sterling-Fleischman Co.
Booth: 1457 Hotel: Martinique
Exhibiting its one-man hydraulic drum lift.

Stoffel Seals Corp.
Booth: 661 Hotel: Ritz-Carlton
Exhibiting its new tamperproof seal along with other items in its line of seals, sealing devices, etc.

Sun Chemical Corp.
Bensing Bros. & Deeney Div.
Facile Corp. Div.
General Printing Ink Co. Div.
Booth: 542, 546 Hotel: Shelburne
Exhibiting package designs that display printing by letterpress, flexographic, rotogravure and offset lithography, flexographic inks, extrusion tapes, and flexible materials for packaging.

Swift & Co.
Booth: 641-45 Hotel: Shelburne
High-speed resins for packaging machinery, hot-melt adhesives for high-speed packaging, new adhesives for the canning industry, including resin lap-end paste, easy-opening case sealing and palletizing.

Switzer Brothers, Inc.
Booth: 1423 Hotel: Lombardy Motel
Exhibiting its fluorescent printing inks for gravure, letterpress and lithography and cartons printed with these inks.

Syntron Co.
Booth:1341
Exhibiting its electric vibrators, vibratory feeders, flow control valves, hopper level switches, vibratory packers and vibrating parts feeders. Also showing a motorized flow control valve.

Technical Tape Corp.
Booth: 610-12 Hotel: Ritz-Carlton
Exhibiting its complete line of industrial and electrical tapes, and its new line of retail tapes, including pressure-sensitive labels, a label dispenser and produce bags.

Tee-Pak Inc.
Booth: 1553 Hotel: Shelburne
Exhibiting its seamless transparent cellulose bands for multipackaging.

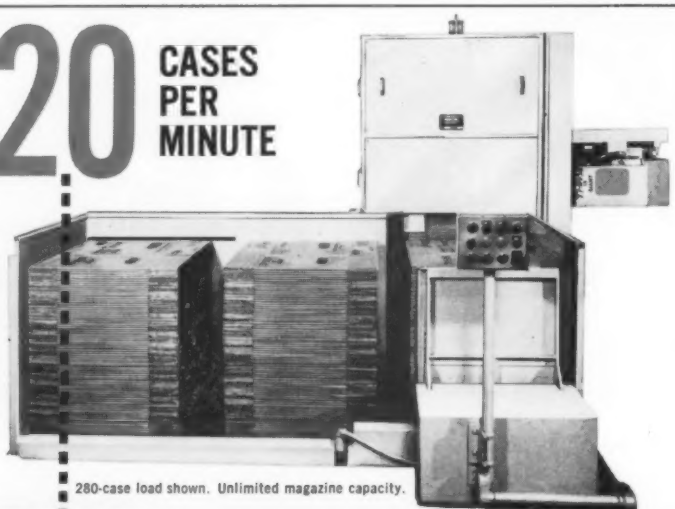
Thatcher Glass Manufacturing Co., Inc.
Booth: 564 Hotel: Claridge
Exhibiting its general line glass containers, consumer glass products, plastic squeeze tubes and secondary cellulose closures and plastic closures.

Tipper Tie, Inc.
Booth: 1448 Hotel: Dennis
Exhibiting its new equipment for applying flat aluminum clips on any size cellulose or fibrous casings as well as its general line of casing closure machines.

Toledo Scale, Div. of Toledo Scale Corp.
Booth: 1140 Hotel: Claridge
Exhibiting its automatic checkweigher, running at speeds to 40/min., its remote weight data recording equipment and its general line of weighing equipment.

Tompkins' Label Service
Booth: 664-66 Hotel: Claridge
Exhibiting its pressure-sensitive, heat-seal bag headers, continuous roll, greaseproof inserts, gummed and ungummed

20 CASES PER MINUTE



280-case load shown. Unlimited magazine capacity.

CARAL SHIPPING CASE FORMER

No operator needed! Fully automatic CARAL unit forms cases at speeds to 20 per minute. Smooth, jam-free operation adjusts to standard and special case sizes; adapts to all standard case packers with a minimum of modification. Easy, floor level loading. Cases formed from top of stack. Units now operating save owners dollars and down time. The *CARAL Case Former* will do the same for *you!*

Write today!
Details sent immediately!

CARAL PACKAGING MACHINERY INC.

579 Cleveland Avenue
Albany, California
Phone: LAndscape 4-7755

labels, as well as labels for high-speed automatic equipment.

Tri-State Plastic Molding Co.
Booth: 628
Hotel: Chalfonte-Haddon Hall
Exhibiting its line of clear-rigid polystyrene containers in round, oblong, and square shapes — equipped with close-fitting lids with snap-on, hinged, or twist-off covers.

Tri-Wall Containers, Inc.
Booth: 100 **Hotel: Traymore**
Exhibiting various heavy-duty packaging designs constructed of its triple-wall corrugated board.

Tronomatic Machine Manufacturing Co.
Booth: 1438 **Hotel: Dennis**
Exhibiting its line of sheet thermoforming, fabricating, and heat sealing equipment. Also showing equipment for automatic molding of expandable polystyrene beads.

Union Carbide Plastics Co.
Booth: 353 **Hotel: Traymore**
Exhibiting uses and application of polyethylene flexible packaging with emphasis on film and coated products. Also showing details of automatic machinery for handling these materials.

Union Paste Co.
Booth: 204 **Hotel: Shelburne**
Exhibiting (jointly with Southern Adhesives Corp. and F. G. Findley Co.) packaging and converting adhesives and a new method of automatic case sealing.

Union Steel Products Co.
Booth: 322 **Hotel: Dennis**
Exhibiting its lines of wire mesh shipping, storage and in-process containers, including those with capacities to 6,000 lb. Also showing slat, wire belt, and solid belt conveyors.

U. S. Engineering Co.
Booth: 149-51
Exhibiting its new and standard counter and parts feeding equipment and its new vial unscrambler, running at 150/min.

U. S. Industrial Chemicals Co.
Booth: 1231-33-35, 1328-30-32
Hotel: Traymore
Exhibiting use of its materials in packaging and offering technical consultation on polyethylene packaging.

United States Printing and Lithograph Company
Booth: 1023 **Hotel: Shelburne**
Exhibiting its multicolored packaging and advertising materials by letterpress, offset lithography and gravure, including folding cartons, labels, and box wraps in paper, paperboard and foil. Also showing multipacks, and display containers.

The Varigraph Co.
Booth: 1050 **Hotel: Dennis**
Exhibiting its lettering instrument in the preparation of original display lettering art.

Varn Products Co., Inc.
Booth: 1523 **Hotel: Saxony**
Exhibiting for the first time its line of non-offset sprays. Also showing its standard line of chemicals and solvents for lithographic, letterpress, flexographic and gravure printing.

Vertrod Corp.
Booth: 658 **Hotel: Empress Motel**
Exhibiting its line of thermal impulse sealers and trim sealers including its new heavy-duty sealer for seals up to 96 in. long and packaging films up to 0.01 in. thick.

Web Controls Corp.
Booth: 1055
Showing its double-capacity and transmission speed controls.

Weber Marking Systems Inc.
Booth: 148 **Hotel: Dennis**
Exhibiting its devices to address multiple carton shipments, its label printing machines, plain and die-cut shipping

Label Printer

stencils, singly and in continuous form, its portable tabbing machines, label paper stocks and marking inks. Showing for the first time its label printing machines, printing from stencil or rubber mat at 5,000 labels/hr.

West Instrument Corp.
Booth: 1220 **Hotel: Traymore**
Exhibiting its line of temperature controllers, records, indicators, thermocouples and other pyrometer accessories.

West Virginia Pulp and Paper Co.
Booth: 235-37, 241 **Hotel: Dennis**
Exhibiting the products of its multiwall bag, Hinde & Dauch, kraft sales, and bleached board divisions, along with those of its subsidiary, Virginia Folding Box Co.

Weyerhaeuser Co.
Booth: 1512
Exhibiting use of its Silvatek Div.'s paper overlaid veneer for modular packaging systems, and other uses.

The S. S. White Dental Manufacturing Co.
Booth: 1440 **Hotel: Lombardy Motel**
Exhibiting threaded and nonthreaded plastic caps and plugs for protective packaging.

Wolverine Paper Converting Machinery Corp.
Booth: 634 **Hotel: Ambassador**
Exhibiting illustrations and details of its equipment for flexographic and other printing.

Wood Conversion Co.
Booth: 134 **Hotel: Shelburne**
Exhibiting its line of cushioning materials for the four basic packaging types: surface, pressure, absorption and flotation.

Cushioning Material

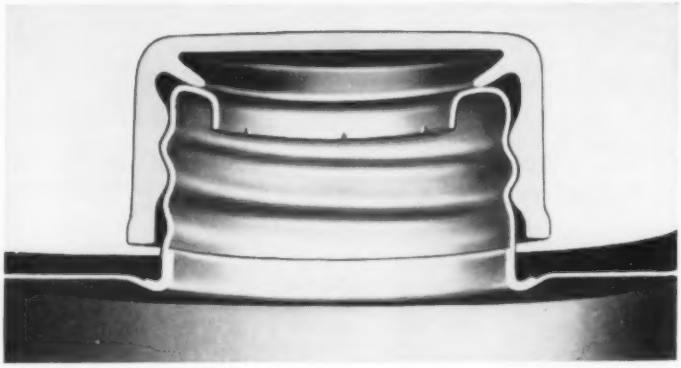
Wrap-Ade Machine Co., Inc.
Booth: 365 **Hotel: La Concha**
Exhibiting its standard unit packaging machine (vertical and horizontal) to handle products and items adaptable to Fin Seal packages.

York Tape Printers, Inc.
Booth: 139 **Hotel: Dennis**
Exhibiting its line of printed pressure-sensitive tapes and die-cut labels, including its dispensers for industrial and commercial use. Also showing an automatic can bundler which illustrates the use of printed pressure-sensitive tape.
(End)

WHIZ-PACKER
VOLUMETRIC FILLERS
Both bench and floor models for filling all types of containers with amounts from several grains up to 5 lbs. with dry products.
Speeds up to 60 fillings per minute.
Quick product changeover.
Contact parts removable for thorough cleaning.
Agitation to suit product.
Most economical filling method.
Write for complete details
FRAZIER & SON
20-01 INDUSTRIAL WEST, ALLWOOD
CLIFTON, NEW JERSEY
Designers and manufacturers of • Volumetric and Net Weighing Machines • Parts Handling Equipment • Rotary Filling Machines • Conveying & Elevating Equipment

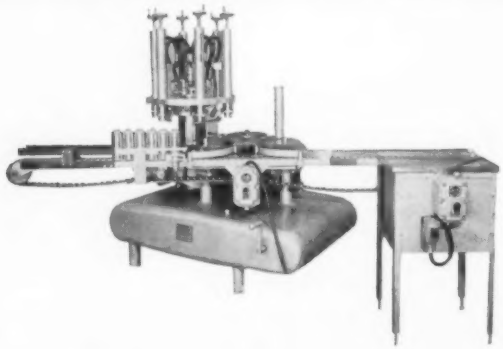
ANNOUNCEMENTS OF MACHINERY AND PRODUCTS

Beneath each announcement is a code number. As you select items on which you want more information, *note* this number. Now, *circle* the corresponding numbers on the postcard, Page 117. Next, *fill* in your name and address. Then, *mail* the card — we pay the postage.



Cap Without Liner

Dover Molded Products Company has introduced a new design of can and bottle caps. Called Un-A-Top, this one-piece molded plastic cap needs no liner, and features a seal which is molded as an integral part of the cap. A seal between the bottle or can and top is attained without a separate liner because the molded sealer within the top grips over the lip of the can or bottle spout. This self-locking seal also provides sufficient resiliency for easy screwing action, both on and off. Design of the new cap allows for easy adaptability to a wide variety of types and sizes of containers. Various types of thermoplastics may be used. Circle No. **1.**

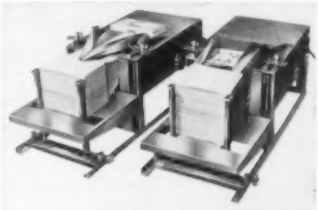


Rotary Aerosol Packer

The Kartridg Pak Company has developed two rotary type machines for aerosol packaging. Both machines are capable of production speeds in excess of 100/min. One machine is a combination pressure filler and vacuum crimper and the other provides a combined operation of pressure filling and automatic affixing of the pressure release button to the filled can. The vacuum crimper functions in such a way that unless a vacuum can be drawn on the can, the crimping head will not operate. This prevents closure of a can on which the valve is not seated properly. Pressure filling is done in the rest of the rotation cycle. Circle No. **2.**

Bagging Magazine

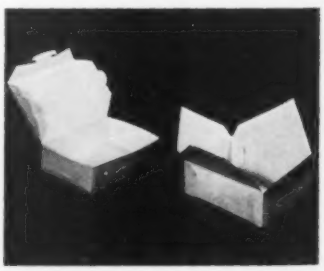
Tele-Sonic Packaging Corp. announces development of a new type of bag feeding magazine for



semiautomatic bagging machines. The unit holds up to ten times as many bags as previous capacities, thus permitting longer runs before reloading the magazine. It features a new "rise-and-fall" principle that elevates the magazine platform automatically as bags are filled and removed for closure. When one package is removed, the next bag is automatically positioned for filling. A jet of air blows open the top bag for rapid product filling. The unit may be used for polyethylene or paper bags of any size. Circle No. **3.**

Funnel Flap Carton

Container Corporation of America has a new carton for frozen food products now being packaged in top-

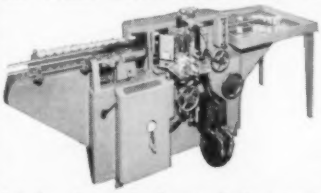


loaded cartons. Called Funnel Pak, the new carton provides better channeling of the product into the carton on the production line. Four top flaps decrease spillage during filling due to their funneling effect. Structural design of carton allows savings in paperboard because there is no over-lapping at front and side walls. Most top-loading frozen food pack-

aging systems can be adapted with only minor machinery modifications, according to Container Corp. Circle No. **4.**

● Bottle Labeler

New Jersey Machine Corp. is manufacturing a new labeling machine for round bottles. The Pony 75



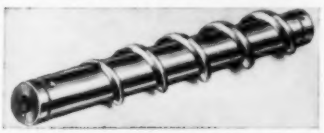
labeler is a high-speed, low-cost machine, utilizing the suction principle of label handling. It features quick changeover from small vials to large gallons, and straight-line, shockless bottle handling with a capacity up to 75/min. The Pony 75 is a companion machine to the Pony Express. Circle No. **5.**

● Polyethylene Coating

Union Carbide Plastics Co. has introduced a new high-density polyethylene extrusion coating compound called DGDD-7401 natural. Coating weights required to give paper impermeability to moisture, grease, and oils, are virtually cut in half when using this new compound, says Union Carbide. It can be extruded onto paper at commercial speed in coating weights as low as 6 lb./ream. DGDD-7401 natural gives multiwall bags scuff and abrasion resistance, improved slip properties, and higher heat resistance. Circle No. **6.**

● Feed Worms

U. S. Bottlers Machinery Co. has developed a new plastic material for use in the making of feed worms or



timing screws. The plastic composition material from which the feed worms (a device for properly spacing containers to be filled on a conveyor system) are made is extremely wear-resistant and yet sufficiently resilient to withstand shock contact. Custom-cutting of the feed worms is provided for a wide range of specifications. Circle No. **7.**

● Interleaving Paper

Orchard Paper Co. has developed a water stain inhibiting paper called Alumitex. The new interleaving paper is a "contact" type inhibitor sheet and must be placed in direct contact with the metal, in this case aluminum, to be protected. The paper is now available in two basis weights: 20 and 35 lb./ream (24x36-500). Rolls are stocked in 24- and 48-in. widths, 100 yd. in length. In addition, bags, sheets, and die-cut shapes may be obtained on special order. Circle No. **8.**

● Bag Adhesive

Monsanto Chemical Co., plastics div., is manufacturing a new water-soluble polymeric adhesive known as PM-22. The adhesive prevents slipping of polyethylene industrial shipping bags which are stacked or on palletized loads. The new material resists horizontal slipping or shear, and yet permits easy vertical separation or lifting of the stacked bags. Because it is water-soluble, the new adhesive can be removed easily and does not damage printing or stenciling. Absence of organic solvents eliminates toxicity and fire hazards. Circle No. **9.**

● Label Paper

Nashua Corp. is introducing a new label paper grade in adhesive-coated sheets called Davac AP. A high blocking point is built into the adhesive coating to prevent labels from sticking together during storage under varying climatic conditions. The adhesive provides a slight delay be-

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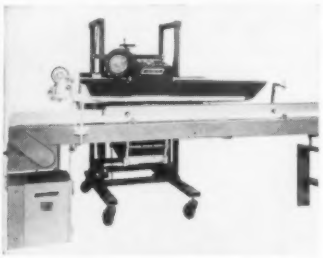
fore positive and permanent bond is made between the label and labeling surfaces, which enables inspectors to straighten improperly positioned labels and thus eliminates relabeling of products. This new expansible, compressible coating moistens uniformly and deeply with an action similar to that of a sponge, Nashua says. Circle No. **10**.

● **Coding Attachment**

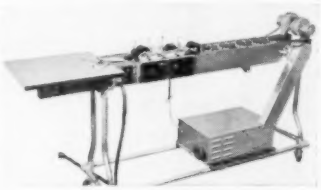
Amsco Packaging Machinery, Inc. is making a new automatic code marking attachment for rolls, breads, and



other soft packages, which may be attached to packaging line conveyors. Utilizing a Kiwi code unit, the new coder attaches to an Amscomatic conveyor and operates with either the Model 100F or 100FA Amscomatic automatic poly packaging line. The attachment places a legible code of up to four digits on each package coming through the sealer under normal high-speed production. The coder is free-riding and friction operated, requires minimum maintenance, and provides package code dating without any added labor or other costs. The attachment has a wheel 5¼ in. in diameter, which is fitted with six marking heads, each with four adjustable marking wheels carrying digits from 0 to 9. Code numbers are changed by dialing the marking wheels. As the conveyor-borne package passes the coder, pressure of the package turns the coder, impressing one or more imprints on the package. Circle No. **11**.

● **Automatic Cartoner**

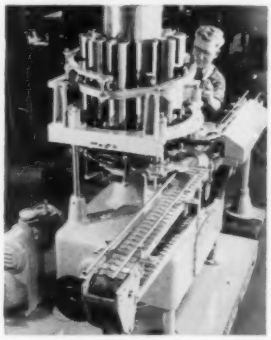
Marathon, a division of American Can Co. announces a new and larger model of its Advac packaging ma-



chine. Designated GM 1500, it is used for automatic cartoning (heat sealing) of vacuum packed luncheon meats in Advac packages. It is bigger, faster, and more durable than previous models, and was built to meet the demands of tough production schedules. The new model has an increased heating area, increased cool (seal setting) areas, and variable speeds of from 20 to 50 cartons/min. The packaging machine is designed to handle any pouch style or material. Circle No. **12**.

● **Piston Filler**

The Pfaudler Co. is producing a new 10-station rotary piston filler, Model RP-210. It handles products ranging



from semi-viscous to semi-solid, and in consistency from that of evaporated milk to potted meat. It is designed to operate at speeds up to 300 containers/min. depending on

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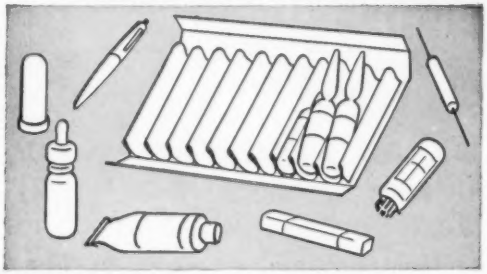

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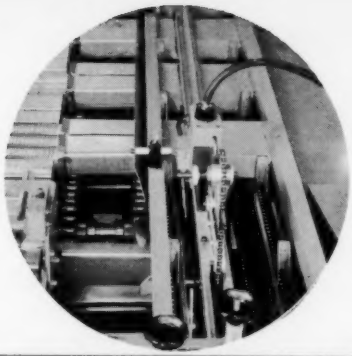
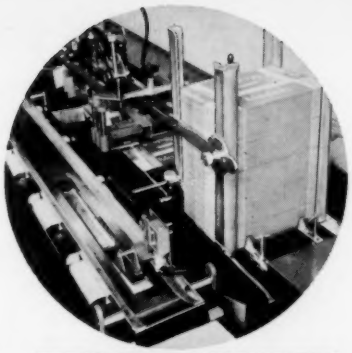
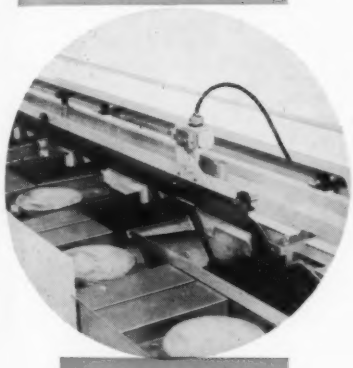


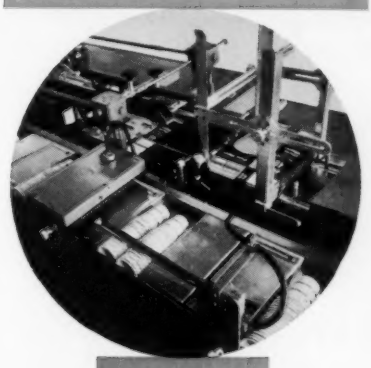
FOR COOKIES AND CRACKERS



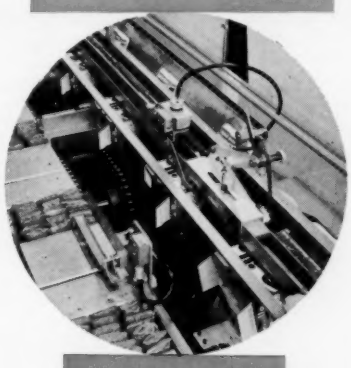
FOR SANITARY NAPKINS



PIES AND CAKES



PAPER CUPS



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container size and product, with an accuracy of 1/10 fl. oz. Cylinders are offered in three standard sizes: The 1¾-in. diameter cylinder fills from 1 to 8 oz./stroke, the 2¾-in. from 4 to 16 oz., the 3¾-in. from 8 to 38 oz., and a special 3¾-in. is available for up to 46 oz. The new unit is suited for use with glass, paper, or pre-pack containers because of a continuous 4-ft. infeed and 4-ft. discharge, through-feed conveyor. Standard metal can chutes or infeed conveyors are supplied in 4-, 6-, 8-ft. lengths. Circle No. **13.**

● Shrink Tunnel

Cryovac Division of W. R. Grace & Co. has developed a fully automatic hot-water shrink tunnel for packaging operations which use shrinkable plastic films. The new tunnel, Model 6543, features one continuous flow-through operation. Packages are carried horizontally straight through the tunnel on a motor driven, stainless steel conveyor with flexible grid. Thus, there is no dropping of the product going into the tunnel or coming out, and it is not totally immersed. The tunnel is designed to handle a wide variety of products packaged in shrinkable film with maximums of 10 lb. in weight and 11 in. wide by 9½ in. high. The unit is medium in size taking 54x24 x53 in. of floor space and it stands 53 to 57 in. high. Each foot has a 4-in. height adjustment and the entrance and discharge conveyors at either end are independently adjustable to make the machine easily adaptable to any packaging line. Double silicon-coated fibreglass detachable curtains, with staggered slits, hang at both ends of the tunnel to keep vapor loss at a minimum. Flexible flue connection provides for venting vapor to the outside of the building. Standard speed for the tunnel conveyor is 50 ft./min., but other fixed speeds are available for any special needs. Circle No. **14.**

● Automatic Web Splicers

Butler Automatic Machine, Inc. is making a new SU Series web splicer. The attachment automatically splices the leading edge of a new roll of

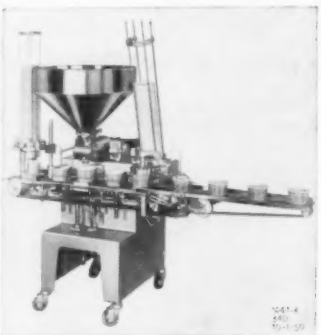
material to the tail end of the depleting roll. It then trims the tail end with an automatic knife which limits the extension of the spliced tail to only one spliced panel. Standard models of the self-contained splicing mechanism fit all web-consuming machines for webs up to 25 in. wide. It is attached to the frame of the parent machine and existing roll stands may be used. Circle No. **15**.

● Plastic Shipping Sack

Owens-Illinois Glass Co. is beginning production of a polyethylene-based, heavy-duty, plastic shipping sack for industrial and agricultural products. It offers exceptional strength and effective protection against moisture and contamination by chemicals and other foreign substances. The shipping sacks will be of the extruded, blown film type. Circle No. **16**.

● Filler and Capper

Anderson Bros. Mfg. Co. announces a new series of universal filler and capper equipment for nesting-type



round cups. Each of the four new 340 Series models handles a full range of sizes from 8 to 32-oz. capacities; either paper or plastic with metal, plastic, or paper lids. The standard Model 340 will come equipped with 20-gal. hopper, hopper cover, variable-speed drive, casters for portability, and leveling legs. This unit has a screw-type cup dispenser for one size cup only. Standard Model 340-1 is the same as Model 340 except with no hopper or hopper cover, and is used for direct gravity-fill operations only. Economy Model 340-2 compares with Model 340, but will not come equipped with casters, variable-speed drive, hopper cover, or leveling legs. Model 340-3 is the economy version of Model 340-1 and may be obtained with the extras needed to suit a specific operation. Models 340 and 340-1 are equipped with a variable-speed drive for adjusting the cup feed rate from 25 to 60/min. Models 340-2 and 340-3 have a fixed cycling speed of 40 cups/min. Circle No. **17**. *(Turn page)*

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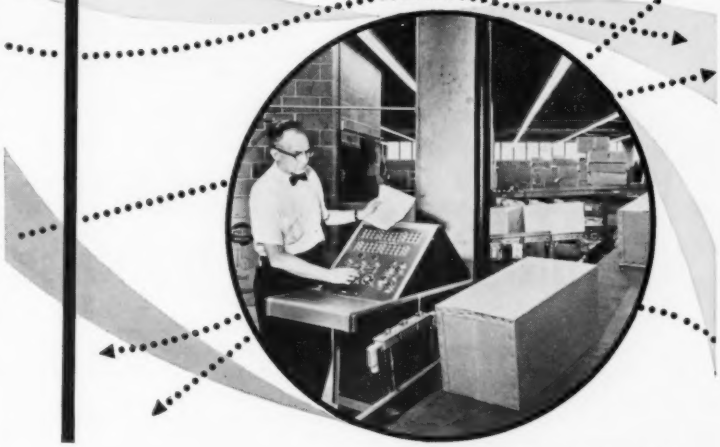

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● Photoelectric Amplifier

Photomation, Inc. has developed a miniaturized photoelectric amplifier which relays reflector type pickups.

Model RFU-7 reflecting type is designed to provide a compact, self-contained, adjustable pickup for use with the company's various controls and counters. Position of the light source and photo unit is adjustable as to the angle and reflection of spot distance. The relay can be triggered to act at any desired threshold of reflected light. Size of the unit (1¾x 2½x2¾ in.) permits installations in machines where space is limited. Circle No. **18.**

● Electric Counter and Packer

Fairchild's, Inc. has introduced a new multi-speed electric counter and packer. The new Model 33 can

fill a minimum of 40 containers/min. (about one-third of its potential) in counts of 100 of a product approximately the size of an aspirin tablet. It can handle such things as capsules, dusty products such as uncoated tablets, or steel hardware items. The main features of the machine are two independently controlled vibrators, adjustable pitch table top, and variable-speed drive. Circle No. **19.**

● Oil-Resistant Paper

Paterson Parchment Paper Co. has introduced Patapar oil barrier parchment. Designated Code No. 35-41T, this material resists the penetration of oils and, at the same time, stops the normal tendencies of oils to spread along its surface, accord-

ing to Paterson. It can be glued with conventional adhesives, can be easily printed, and fits well into accepted package converting operations, Paterson says. It has an air-dry yield of 12,350 sq. in./lb. Its basis weight is 35 lb. for 500 sheets 24x36 in. and its caliper measures 2.7/2.9 mils. Circle No. **20.**

● Marking, Coding Unit

Thomas Engineering Co. reports development of a new package marking and coding attachment which requires no liquid ink. The Teko coder is a fully automatic, friction-operated machine for marking and coding all types of porous packages, cartons, bags and shipping containers. It features a Porelon plastic inking cylinder which eliminates the need for fluid inks, ink reservoirs, felts and solvents, Thomas says. This coder can be used in any position, to print on any surface of the shipping container or package. It will print copy up to 12 in. deep and 12 in. long. Cylinders, when exhausted can be changed in less than 30 sec., according to Thomas. Circle No. **21.**

● Plastic Container Filling

MRM Co., Inc. has developed for its liquid fillers a new attachment that grips the neck of thin-walled plastic containers to prevent crushing and inaccurate fills. Engineered to handle any size plastic container, including qt. and gal. sizes, the new attachment assures accurate fills during high speed production without the need for additional equipment, MRM says. Stainless steel arms circle and grip the plastic container's neck. The steel arms and container neck alone bear the pressure of the spout's spring to activate the product flow. No pressure is exerted on any other part of the thin-walled container. Working on the scissor-grip principle, the new attachment performs automatically and is synchronized with the normal filling operation. Circle No. **22.**

● Nozzle-Cap Closer

Continental Can Co. announces the availability of a hand-operated closing machine to insert "Flip Cap," a polyethylene nozzle with a permanently attached cap for use on round and oblong nozzle-type cans. This machine can be operated at speeds of 20 cans/min. or more, depending upon manual operator's facility. In operation, the cap is hand-placed on the top opening of a can, then a round plate presses the cap firmly into the curled opening. Although nozzles are delivered with captive cap seated in the closed position, the machine will also close any partially opened caps while it does the inserting job. Circle No. **23.**

(End)

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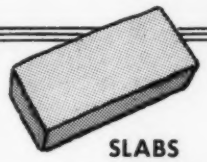

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A-B-C Short Case Sealer

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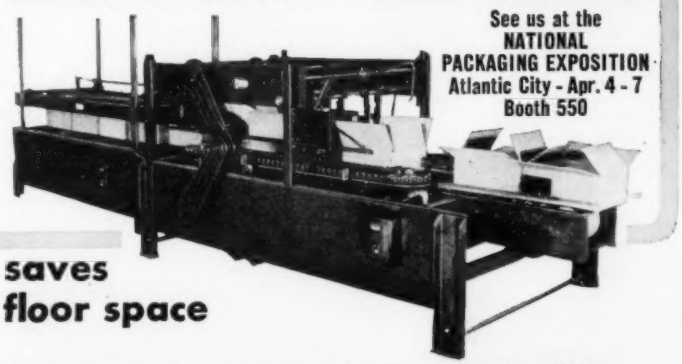
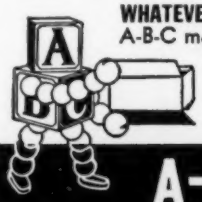


saves floor space

This A-B-C Short Case Sealer really increases packaging efficiency. Glues, folds and seals either or both top and bottom flaps in one operation—automatically. Speeds up to 30 cases a minute. Finest welded construction. Ball bearing construction reduces maintenance. Guaranteed not to get out of "time".



WHATEVER YOUR PACKAGING PROBLEM, there's a proved A-B-C machine to solve it—case sealers, unloaders and unscramblers, side sealers and hand gluers.

WRITE TODAY FOR DETAILS— FLOOR PLANS & SPECS

A-B-C PACKAGING MACHINE CORP. TARPON SPRINGS, FLORIDA

Circle No. 276 on Card, Page 117

Here's a tissue that drinks HOT MELTS!

Tissues that absorb hot wax, resins, adhesives, or the like, are not new, but you get a big, important extra when you buy Crystal Tissue.

The BIG Crystal extra . . . is its ability to absorb UNIFORMLY across the width of the roll which is particularly important in wet-strength papers.

Have a need for tough tissues that can be twisted, woven, sewed, impregnated . . . whatever your problem, chances are Crystal has or can develop the tissue you need.

Just send the coupon or write.

First name in tissues for over 60 years.

Crystal®

The Crystal Tissue Company, Middletown, Ohio

I want samples and more information on Crystal Tissues for special applications.

PE-360

*Name*_____

*Title*_____

*Firm Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Don't miss the Oliver exhibit at the AMA Packaging Exposition Space No. 637 — April 4 to 7

See the latest development in labeling!

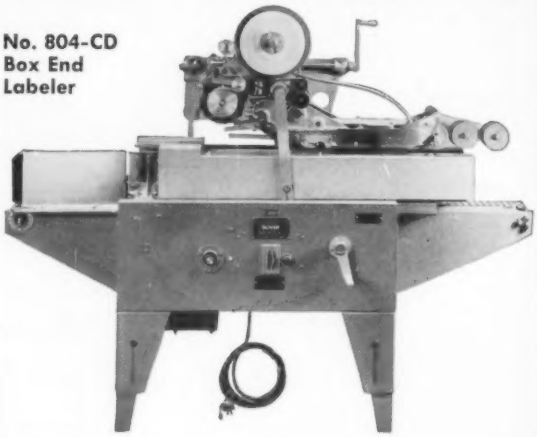
OLIVER NO. 900
LABEL IMPRINTER-REWINDER
with the amazing
OLIVER ROTARY IMPRINTER

The Rotary Imprinter imprints large or small size copy on roll-type labels. Imprints are sharp and neat as those produced on flexographic presses. This easy-to-operate imprinting system offers unlimited money-saving opportunities.

OLIVER LABELERS

heat-seal colorful roll-type labels to the side, end or top of a carton or overwrapped package

No. 804-CD
Box End
Labeler



End Labeler

Handles boxes 7½" to 16" high, 3½" to 5⅞" wide, 4" to 10" long. Heat-seals roll-type label to end of package. Label size: 1" to 5" wide, 2" to 6" long. Speeds up to 80 a minute.

Top Labeler

Handles cartons, bread, cluster buns. Packages: 6" to 18" long, 2½" to 10" wide, 1¼" to 7¾" high. Heat-seals roll-type label as large as 3" x 5" to package top at 40 to 100 a minute. Or label as large as 6" x 5" at 40 to 80 a minute.

Side Labeler

Handles packages 1¾" to 2¼" long, 5⅛" to 10⅛" wide, 4-1/16" to 7⅜" high. Heat-seals labels up to 3" x 3½" at 120 a minute. Frequently used to seal a carton pouring spout.

Oliver Labelers — especially with a new No. 809 Rotary Imprinting system — open new opportunities to merchandise and promote sales of a product. Variations of the No. 804 Labeler can be customized to handle your special problem.

The entire labeling operation now costs less than changing the design of an overwrap or box. Attractive labels come in low-priced rolls . . . easy to change, handle and stock.

The design of the Oliver labeling equipment is basic for the development of solutions to many labeling problems. An Oliver Labeler can be built to handle packages in a range of sizes or for a single purpose. Let our packaging engineers recommend a paying solution to your special problem. *Write today for all the facts!*

Oliver PACKAGING DIVISION
MACHINERY COMPANY
445 6th, N. W., Grand Rapids 4, Michigan

Circle No. 277 on Card, Page 117

Circle No. 278 on Card, Page 117

AMA publishes "Progress report" on plastics for packaging

Plastics have made great strides, and are continuing to make greater ones into the packaging field. To aid in keeping abreast of the field those persons involved with packaging all kinds of products, the packaging division of the American Management Association recently published *Packaging With Plastics*. It is designated AMA Management Report No. 29.

Compiled to acquaint one with some of the significant, recent developments in plastic packaging, the 131-page, paper-bound report is divided into four parts, covering respectively, progress, materials, equipment, and methods. Part I includes a discussion on progress made in plastic packaging in the past two decades, and the prospects for the future.

Cost And Performance Report

In a cost and performance report, a comparison is made between rigid plastic containers and glass containers for foods. The author points out that rigid plastic containers have replaced glass for food packages only in limited amounts because of keeping quality (in the case of long shelf-life items) and/or cost. In contrast, flexible plastics have gained "an indispensable position for themselves," according to the author.

The second part contains seven papers on plastic materials – poly-

(Continued on Page 114)

Directory of reports of produce packaging research is published

A great deal of research has been done in the field of produce packaging. However, the results and conclusions are known to only a few persons. This has been due to the fact that the availability of the reports on this research has not been publicized too much, although most of them may be had by anyone interested.

This directory was assembled with two objectives in mind: (1) Greater utilization of the extensive work already completed, and (2) closer cooperation among those persons interested in this area, and who are doing, or are planning to do, research in packaging of produce.

Compiled by Robert L. Bull and George R. Glading, both of the University of Delaware, in cooperation with the Produce Packaging Association, the revised edition of *Directory of Research Reports Relating to Produce Packaging* was published recently. The paper-bound, enlarged directory lists nearly 300 reports on work done within the past ten years at various land-grant colleges in the United States, and well over 200 reports referenced by the U.S. De-

(Continued on Page 124)

COES
MICRO GROUND
QUALITY
KNIVES
FOR
PACKAGING
MACHINERY
THE BEST MACHINES DESERVE THE BEST KNIVES
For longer life and less down time specify Coes Knives on your new original equipment. These knives give you clean, true cuts that mean more production, finer quality and consistent performance.
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KNIFE COMPANY
62 COES STREET
WORCESTER, MASS.

It can't be just "adequate"...

PACKAGE MARKING

either makes money or wastes it

Readable, attractive marking made by Markem machines on your boxes or labels helps them from the moment they're marked to the time they're used — and can even help future sales as well. Good marking speeds handling . . . reduces waste and packing errors . . . allows quick selection by customers . . . simplifies and encourages reordering . . . carries the "quality" message of modern package design.

In contrast — *hard-to-read, uneven, "home-made" marking is a hindrance to your package or product from beginning to end* — and can actually waste thousands of dollars a year.

And a Markem marking method makes important "in-plant" savings as well. The right Markem machine, type and specialty ink working in your plant marks the *right* quantities at the right time — with savings in inventory, labor and delivery time . . . eliminates waste from obsolescence . . . handles "short runs" rapidly and economically . . . provides flexibility that allows *one machine to do a variety of marking jobs.*

Call your local Markem man or write directly, enclosing samples and requirements. Markem Machine Co., Keene 35, N. H.

MARKEM

everything industry needs . . . for profitable marking . . . since 1911

Book review

(Continued from Page 113)

ethylene film and coatings, high-density polyethylene, polyethylene copolymers, foamed polyethylene sheeting, polypropylene, biaxially oriented polystyrene, and Videne.

Trends and developments in equipment make up the book's third part. The first paper deals with what to look for in thermoforming machinery. Pointing out that one should go slowly in selecting this type of machinery, the author recommends an in-plant testing operation, and having knowledge of plastic materials and forming techniques.

Machinery More Compact

Describing parameters of injection molding of plastics for packages, the paper on equipment for this process gives the reader a brief run-down of recent developments. It points out that this type of equipment is becoming more compact and requiring minimum maintenance.

The next three papers overlap one another in some areas concerning packaging machines using plastic films. Discussing versatility, compactness, performance and other factors, these papers recommend consideration of certain factors before buying equipment for a given job.

Methods and applications are contained in the last part of the book. Progress in rigid plastic containers is reported, with specific examples discussed according to fabrication methods — injection molding, blow molding, sheet forming.

The section on plastic coatings—the "hidden packages"—is interesting. It relates how such coatings on paper, foil, paperboard, and so on have made such substrates more useful as packaging materials.

The book may be ordered by mail from American Management Association, Inc., 1515 Broadway, New York 36, N. Y. Price: $3.75; to AMA members: $2.50.—H. E. V., Jr.

NEW . . . IMPROVED

MAGNETIC SWITCH

A new, compact, **improved** magnetic switch . . . neatly contained in an epoxy resin shell. The Post MH-2-P, is a magnetically operated sensing device for industrial applications. This proven product may be used to actuate electronic or mechanical counters, controls, solenoids, relays or other types of circuits. The MH-2-P is easier to mount in areas of limited access, and features a quick disconnect Cannon connector.

The MH-2-P is capable of speeds up to 100 cycles per second, and has a life of many billion cycles. Contacts are single-pole, double-throw, rated at 5 amps. non-inductive.

The switch is operated by the proximity of a magnetic field which is usually provided by an Alnico magnet. When the magnet is moved close to the face of the switch, the switch arm transfers contact; and as the magnet moves away, the switch arm returns. Thus it is possible to operate from zero speed up to a transient magnetic field of only eight milliseconds.

By mounting a magnet on a rotating shaft or wheel, the MH-2-P is ideal for counting revolutions, synchronizing, or timing. The outstanding feature of this switch is its ability to provide a sharp, clean "make and break" with no bounce. This is important because the bounce in all other contactors will cause several counts for each contact closure in high speed electronic counters.

SPECIFICATIONS

SWITCH — Magnetic, hermetically sealed in a high-pressure hydrogen atmosphere in a glass capsule.
MOUNTING — Upright, within 45° from vertical.
CONTACTS — S.P.D.T. 5 amps. non-inductive (Mercury wetted contacts).
SPEED — Zero to 100 per second.
MINIMUM MAGNETIC FIELD TRANSIENT TIME — .008 seconds (8 milliseconds).
LIFE — Conservatively rated in excess of one billion operations.
WEIGHT — App. 3 ozs. **OVERALL HEIGHT** — 5⅝ in.
ENCLOSURE — Epoxy Resin. **COLOR** — Grey
MAXIMUM AMBIENT TEMPERATURE — 100°F (Consult factory if switch is to be operated at higher temps.)

The usual contact "bounce" is eliminated by virtue of the damping action of a capillary film of mercury.

Decitron

ELECTRONIC PRODUCTS DIVISION

POST MACHINERY COMPANY

175 Eliot Street, Beverly, Massachusetts

INDUSTRY LITERATURE AVAILABLE FREE

Beneath each announcement is a code number. As you select items on which you want more information, *note* this number. Now, *circle* the corresponding numbers on the postcard, opposite this page. Next, *fill* in your name and address. Then, *mail* the card — we pay the postage.

Reinforced Gummed Tape

Ludlow Papers, Inc. offers a 4-page folder on its Comet Snake tape—a Fortisan reinforced tape used in carton sealing. Illustrations show advantages claimed for tape, as well as its various uses. Circle No. **101.**

Rotary Piston Fillers

The Pfaudler Co. offers Bulletin No. 911 which describes its line of rotary piston fillers available in four models. Designed for packaging viscous or semisolid products within speed range of 60 to 600/min., machines handle tin, glass, and composition containers of most shapes, provided they have open mouth of 1½-in. diameter or larger to permit filling. Specifications and dimensions for each model are included. Circle No. **102.**

Electronic Counters/Controls

Post Machinery Co., electronic products division, is offering Bulletin B, which briefly describes its line of electronic counters, controls, photoheads, and accessories. Illustrations are included. Circle No. **103.**

Plastic Fitment Applicator

Resina Automatic Machinery Co., Inc. has an information sheet describing its Model SA plastic fitment applicator. This machine can operate independently or with a screw capper. It selects and applies perforated plastic fitments of varied sizes. It also handles the solid type of fitments with side tabs commonly used in drug and pharmaceutical fields. Circle No. **104.**

Wrapping And Bundling Machines

Battle Creek Packaging Machines, Inc. offers a 20-page booklet picturing its line of wrapping and bundling machines, and the types of packages each model produces. Chart is included showing optional equipment available for each machine. Circle No. **105.**

Control Devices

Industrial Nucleonics, manufacturers of AccuRay control devices (used to measure, detect, and control coatings, impregnations and container fill-levels with extreme accuracy), offers two brochures describing a variety of its products. Circle No. **106.**

Coding/Dating/Pricing Imprinters

Industrial Marking Equipment Co., Inc. offers an 8-page brochure illustrating and giving specifications for a number of its imprinting machines. Discussed are the Whippet conveyor line marker; the Auto-Printer for high-speed work on cartons, multiwalls, etc.; No. 6 Auto-Printer for filled cartons; the Rainbow attachment for flexible packaging; the Flexo Press which prints multiwalls and flat cartons on both sides simultaneously plus many others. Circle No. **107.**

Case Opener/Former/Positioner

Crompton & Knowles Packaging Corp. has available an information sheet on its CK/CO case opener-former-positioner with discharge. This unit can be operated either mechanically or pneumatically and runs at the rate of 40 and 25 cases/min. respectively Specifications, features and drawings are included. Circle No. **108.**

Corrugated Shipping Containers

Mead Containers Inc. has a 20-page booklet, "Mead container power," which illustrates and describes the advantages of its corrugated shipping containers. Mead's design, research and production facilities are also described. Circle No. **109.**

Polyethylene Packager

Seal-A-Round Corp. offers a data sheet on its semiautomatic polyethylene packager. It produces a plastic package sealed on either three or four sides, in one operation, and is capable of packaging 4,000 pieces/day. Circle No. **110.**

Protective Packaging Material

Owens-Corning Fiberglas Corp. offers a 4-page data sheet on its Fiberglas, a protective packaging material available in a variety of densities. Offering a choice of compression resistances, the material is said to be easily fabricated, noncorrosive, unaffected by rot, moisture resistant, and highly resilient. Circle No. **111.**

Foil Bag-Header

Labels and Decals, Inc. offers samples and information on its foil bag-header. Said to be readily heat-sealable in production runs, it is available in two types, one for sealing cellophane, K203 and Saran, and one for polyethylene. Circle No. **112.**

Polyethylene Films

Phillips-Joanna Co. has an 8-page booklet describing its line of PhilJo polyethylene films. Said to be low in moisture transmission, the films are available in a range of types, from a single source. Circle No. **113.**

Paper/Chipboard Partitions

W. J. Bradford Paper Co. has a 4-page brochure picturing a variety of its paper and chipboard partitions and die-cuts. Special designs are available for machine parts, electronic and automotive parts, pharmaceuticals, candies and cookies. Circle No. **114.**

Braces, Blocks, Cushions

Celotex Corp. offers a 12-page booklet describing and picturing a variety of products protected by Celotex braces, blocks and cushions. Celotex industrial fibreboard applications are shown in commercial, automotive, electronic and aircraft application. Circle No. **115.**

Dry Filling Machines

Paul Karstrom Co. offers a brochure on its Spee Dee package filling machines, designed for dry products such as beans, noodles, nuts, sugar, candies, etc., in sizes from 2 gm. to 5 lb. Circle No. **116.**

Corrugated Boxes

Hinde and Dauch offers a 32-page book, "How to pack it in H & D corrugated boxes." Picturing 80 different styles of corrugated boxes designed for various purposes, the booklet describes the uses and advantages of each. Circle No. **117.**

Vertical Case Sealer

Midnight Engineering Co. offers a data sheet on its vertical case sealer. Designed to save floor space, machine is 64 in. long, and Midnight says it reduces sealing time. It delivers sealed cases near ceiling, permitting overhead conveying to shipping points or storage area. Circle No. **118.**

Liquid Filler

Popper & Sons, Inc. offers its bulletin #659F with details and photographs of its expanded line Model LF-540. Containers from 1 dr. to 12 oz. in plastic or glass, can be handled at speeds from 3,000 to 15,000/hr. Circle No. **119.**

Corrugated Case Sealer

Eliot Manufacturing Co. has a data sheet on its automatic case sealer which glues top and bottom flaps and seals in one operation. Machines are 38 in. wide and range from 14 to 34 ft. in length. Models for handling cases ranging from 6 to 16 in. wide, 9 to 21 in. long, and 3 to 16½ in. high are described. Circle No. **120.**

Reinforced Plastic Tape

Johns-Manville Dutch Brand Div. offers an 8-page illustrated brochure on pressure-sensitive reinforced vinyl plastic tape for bundling, palletizing, reinforcing, unitizing and tear-stripping. Circle No. **121.**

Corrugated Box With Liner

Stone Container Corp. has an illustrated 4-page pamphlet describing a corrugated box which is available with plastic box liner for packaging liquids, semiliquids and powders. Circle No. **122.**

(Next Page)

Adjustable Case Sealer

J. L. Ferguson Co. has available a brochure about its Omnimatic-Rotopress — a fully automatic case sealer that seals and discharges all corrugated shipping containers without regard to size. It automatically adjusts to a wide range of sizes fed in random order. Compression unit is circular, enabling user to use variety of compression times with no increase in floor space. Entire unit takes up 144 sq. ft. of space. Circle No. **143.**

Corrugated Cushioning

Vanant Co. has prepared a kit of photographs showing typical users of Sus-Rap, its patented corrugated cushioning material. Some products protected by Sus-Rap are clocks, TV sets, signs, plate glass, etc. Circle No. **144.**

Cushioning Material

Wood Conversion Co. has an 8-page brochure (Form 650) showing typical applications and giving data on Tufflex cellulose fibre cushioning and Tufflex fabric. Used for cushioning all types of merchandise, for surface protection, pressure point padding, flotation packaging and neutral wraps. Circle No. **145.**

Container Air Cleaner

U. S. Bottlers Machinery Co. offers an 8-page booklet, No. 081558, picturing its Sanitair automatic air cleaner for cleaning all types of containers from 1 to 14 in. in height, and 1 to 4½ in. in diameter, by compressed air. Suitable for aerosols, pharmaceutical, food, etc., it is readily adjustable for various sizes and has variable speed drive so it can be integrated into existing packaging lines. Circle No. **146.**

Automatic Packager

General Packaging Equipment Co. has available an illustrated brochure describing its five models of automatic packagers which package such products as potato chips, candy, frozen foods, and soaps. Circle No. **147.**

Silicone Rubber Fibrous Cushioning

The Connecticut Hard Rubber Co. has available a data sheet on its silicone rubber fibrous mat, which, CHR says, possesses qualities superior to those of silicone sponge and foam. Among its properties are low compression set, good tear resistance and good tensile strength. Circle No. **148.**

Corrugated Box Making Machine

Colt Packaging Machinery Co. is offering a brochure describing its Rite-Size box machine, designed to produce, from corrugated sheets, unlimited styles and sizes of shipping containers, plus pads and liners. Changeover of sizes can be made in approximately 1½ min. Diagrams suggest floor plans (covering only 1,600 sq. ft.) for setting up a box making department. In addition to general information, a description of how the machine operates and its limits and allowances are given. Circle No. **149.**

Cellulose Band Applicator

The John Burton Machine Corp. has a brochure which tells of its line of equipment to mechanically apply cellulose bands to bottles and jars. Machine holds large spools of continuous cellulose tubing which is pulled over bottle and cutoff to specified size. Four models are shown which provide production speeds from 20 to 200 bands/min. Circle No. **150.**

Impregnated Felt Tape

Coast Pro-Seal & Manufacturing Co. has available a folder on the uses of its impregnated felt tape in crating and packaging. Uses discussed are vibration gasketing, antiscratch gasketing, antimoisture and antidust seal and a drum and barrel seal. Circle No. **151.**

Moisture Detection Equipment

The American Instrument Co. has available a 69-page catalog, No. 660, featuring moisture-detection, control and alarm equipment. Individual components and complete systems are described, as well as equipment for measuring and/or recording relative humidity, dew point, and moisture content. Individual instruments include. Indicators, controllers, recorders, nondestructive package inspection equipment, etc. Circle No. **152.**

Continuous Motion Case Packer

Atkron, Inc. has available Bulletin No. CP-701 which describes a continuous motion case packer. Machine packs bottles, cans or jars up to 32-oz. in standard return cases or shipping cartons — including four-flap cartons. Illustrations, operating details, floor plan and elevation drawings with specifications are included. Circle No. **153.**

Infeed Timing Screws

Horix Manufacturing Co. has available details on its feed screws for use on other machinery. A patented cutter automatically produces the exact pitch and correct pocket (straight side or contour) for the container. Timing-control screws can be made in almost any dimension and from a choice of different materials including a number

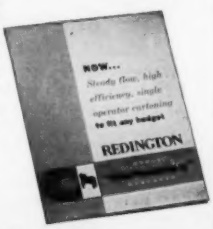
Carton 40-60 Units Per Minute—with just one operator—at LOW MACHINE COST

Just one compact, efficient machine—with just one operator—will handle almost any product you package in reverse tuck folding cartons, at the rate of 10,000, 15,000, 18,000 packages per day. Yet, installed and turning out steady production, costs less than $5000!

REDINGTON automax® CYCLE CARTONER

feeds and forms cartons, places them in conveyor pockets. One operator places the item to be cartoned in each of the three loading troughs, then pushes slide forward and back. AUTOMAX tucks in end flaps, discharges finished packages, restarts the cycle—*all automatically!*

Solidly built for long, trouble-free service, AUTOMAX is just 70" long, 30" wide, weighs only 750 lbs. It's caster-mounted—move it anywhere in the plant you need it, even where floor space is limited. Perfect for tubes, bottles, toys, parts, hardware—whatever you carton. *Adjustable.*



★ *Write for illustrated folder giving full details about AUTOMAX—priced to fit your budget.*

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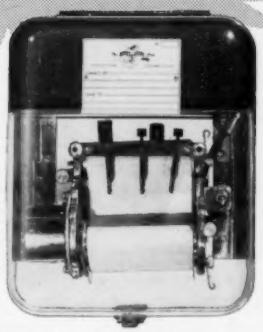
HOW MUCH DOES
SHOCK
COST?



Who knows . . . unless they are using Impact-O-Graphs.

True, Impact-O-Graph won't give you the cost of shock . . . directly. But it will measure the amount of shock your product receives in normal handling. With this information you can take steps to protect your product from costly shock-damage.

Hundreds of progressive executives have already saved hundreds of thousands of dollars for America's leading industrial firms by tracking down the causes of damage with Impact-O-Graphs.

The Air Force, Army, Navy and various ballistic agencies of the government use and have approved the accuracy of Impact-O-Graph as an instrument for measuring shock, acceleration and deceleration.

Various models of Impact-O-Graphs in a wide range of "G" ratings, are available for different requirements. Specify your problem and we'll suggest the correct model.

Impact-O-Graph is a modern, inexpensive, yet extremely accurate instrument that pays for itself many times over where shock-damage is a problem. Send for the complete story. It's National Safe Transit approved. **Leasing arrangements are available.**

The IMPACT-O-GRAPH Corp.
1900 EUCLID AVE. CLEVELAND 15, OHIO

of plastics and metal, plated or unplated. Circle No. **154.**

Convenience Package Openings

The Dobeckmun Co., A Division of The Dow Chemical Co., has a 16-page booklet which details methods for incorporating opening devices into basic package design for a variety of products packaged in flexible or transparent materials. Applications and techniques for using Zip-Tape, Dobeckmun's tear tape with cellophane, polyethylene, paper or paper/foil overwraps and cellophane bags, are included. Also outlined are machine methods for working with this product for splicing and cross-web feed applications. Specific uses for Zip-String, its thin, non-woven Dacron thread built into harder-to-open packages of specially laminated film or foil combinations and Zip-Strip, a device to open polyethylene bags and overwraps by automatically punching a series of perforations in the film are defined. Circle No. **155.**

Conversion Table

St. Regis Paper Co. has a wallet-sized reference table for converting the bag/min. rate of filled multiwall bags to tons/hr. as a guide to production, materials handling, purchasing, research and engineering planning personnel. The table lists the ton/hr. rate of from 1 to 30 bags/min., for 100-, 80-, and 50-lb. bags. Circle No. **156.**

Product Bulletin

Modern Plastic Machine Corp. offers a product bulletin which illustrates and describes plastic extruders, casting roll units, take up equipment, and accessories. Product specifications and features are shown for extruders ranging from 1-in. laboratory models to 6-in. screw diameter production extruders. Combination overhead pinch roll and take-up units for blown tubular film, the MPM sheeting line, and packaged monofilament equipment are also included. Circle No. **157.**

Cast Polyethylene Film

U. S. Industrial Chemicals Co. has available a 12-page booklet, "Cast Film", describing developments in cast polyethylene film. Both film casting equipment such as chill rolls and dies and a comparison of properties among cast, quenched and blown films are included. Booklet discusses processing variables and their effects on film properties and presents tabular data describing such physical properties as yield strength, elongation, film tear strength and friction factor. Circle No. **158.**

Adhesive System

United Shoe Machinery Corp. has a 16-page catalog on its cord-like hot melt adhesive and devices for applying it. Photos and sketches of wheel and nozzle types of applicators, uses of Thermogrip adhesive and applicators, such as bag and folded box-making, food packaging, adhesion of continuous business forms, and moisture tight sealing of multiwall bags are included. Complete specifications on all applicators, descriptions of various formulations of the adhesive, application data and test laboratory services available are presented. Circle No. **159.**

Electrically Operated Imprinter

Bell-Mark Corp. offers a brochure on its Model 6100 Electra-Printa, an electrically controlled device, described as a miniature flexographic press, which places a registered imprint on products, cartons, containers and wraps when activated by a solenoid. Unit comes in two models which deliver 3x1 in. and 3x2 in. imprints respectively. Circle No. **160.**

Automatic Packaging Equipment

Mercury Heat Sealing Equipment Co. has a 6-page brochure illustrating and describing specifications of its Verti-Pac packaging machine, Strip-O-Matic, Flat-Pak, label sealer, portable take-away conveyors and other automatic packaging equipment. Circle No. **161.**

Miniature Photoelectric Pickups

Photomation, Inc. offers its Bulletin 571 showing miniature electronic controls which permit electric eye counting and controlling units to be used. The pickups may be used to detect interruption of light beam by a passing box or package, edge of sheet, or reflecting units can be used to monitor, register, differentiate between surface qualities, or establish motion limits of paper or a plastic bag. Circle No. **162.**

Labeler

New Jersey Machine Corp. offers its brochure on the Pony 300 which labels containers at speeds up to 300/min. using suction to handle labels and an electronic index that detects label supply interruptions. Shockless bottle feeding in New Jersey's non-stop rotary operation is described. Circle No. **163.**

Hole Punch For Packages

Ketchpel Engineering Co. has Circular F-372 available which describes its Model 55-HF that jolts contents of

Regardless of your gluing needs . . . spotting, rolling, striping, doweling, etc. . . . you can incorporate new Internal Valve FF Glue Guns in your automatic machines . . . existing or new! Over 400 sizes, models to choose from . . . with each unit designed for fast, clean gluing without waste. Easy installation. Guaranteed. Send for your catalog on this marvelous way of "Controlled Gluing". Oh yes . . . FF Guns can be used manually . . .

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Select areas open for agents and distributors

Gaynes **COMPRESSION TESTER**
WITH COMPLETE **ELECTRONIC**
INSTRUMENTATION AND RECORDING
CAPACITY
0-5,000 and 0-10,000
0-15,000 and 0-30,000

INFINITE VARYING SPEED CONTROL
WITH ELECTRONIC POWER PACK AC-DC
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package to bottom of bag, punches hole in center at top. Unit designed for installation on an 84LU Hayssen wrapping machine. Circle No. **164.**

Can Care

Crown Cork & Seal Co., Inc. offers a booklet, "Can care, handling and storage," giving instructions to food packing plant workers to help them reduce losses due to improper handling and storage of cans. Circle No. **165.**

Beach Puncture Tester

Testing Machines, Inc. offers literature illustrating and describing its TMI Beach puncture tester for determining resistance to puncture of corrugated board, fibreboard, wall board, vulcanized fiber, plywood and heavy liner. Circle No. **166.**

Vibratory Feeder

Eriez Manufacturing Co. has illustrated brochure describing its electro-permanent magnetic vibratory feeder for precision feeding, spreading, sorting, aerating, cooling, sifting, mixing. Specifications are given. Circle No. **167.**

Cartoning Equipment

Bivans Corp. has a 6-page brochure on its line of cartoning equipment. Shown are its Tuck-O-Mat for setting up and tucking the bottom flap of a folding carton; its Convey-O-Mat, which sets up a carton, tucks the bottom flap, and conveys the set-up cartons upright for filling; its carton closer for automatically tucking the top flaps of filled cartons. Also shown are various attachments such as coder, tuck gluing. Circle No. **168.**

(End)

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Burdet Heinemann and G. G. Garbee, Making large-scale use of bag-in-box packaging

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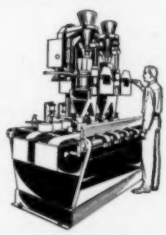

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Structural design notes for corrugated containers

Note No. 14: Triple-wall corrugated boxes - Part I

By K. Q. Kellicutt,
Engineer, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wisconsin

Introduction. In the past, if a corrugated box made from double-faced, single-wall stock was not strong enough for the intended purpose, it was common practice to use a double-wall corrugated box. If the double wall was not sufficiently strong, use was made of wood shipping containers or containers made of a combination of wood and other materials. The fairly recent development of triple-wall corrugated structural material has made the fibreboard box suitable for applications requiring greater strength than double-wall.

Triple-wall boxes are especially suited for difficult, heavy loads that require exceptionally large containers. Although the triple-wall corrugated box is not as resistive to compressive forces as one made from wood, it is appreciably stronger than double-wall. Also, the triple-wall box is extremely resistive to forces that are rapidly applied, such as those encountered when the box is dropped.

Work at FPL on triple-wall boxes began as a project for Wright Air Development Center to evaluate and appraise them. Because of the good results obtained, it was decided that the material had considerable potential for use as a rigid, relatively lightweight container, and further work was done with it.

Triple-wall and double-wall boxes of a given size were compared to justify the inclusion of this new container under Rule 41 of the Consolidated Freight Classification.* Further, experiments were made to determine what combination and arrangement of flutes and component paperboards would provide the most rigid material from which to make the boxes.

More recently, a variety of sizes of triple-wall boxes has been evaluated to establish a compressive strength standard for the federal specification that covers their requirements.

In this note are summarized some of the aforementioned work and subsequent notes will cover other parts of the work.

Triple-Wall Corrugated Boxes

The styles of triple-wall boxes currently available are covered in Federal Specifications, "Boxes, corrugated, triple-wall, 350-pound maximum weight," PPP-B-640b. In addition to the regular slotted box and full telescope type, there are four styles that combine wood with triple-wall in order to attain the highest possible stiffness and resistance to rough handling. However, the most extensive use of triple-wall is made with the regular slotted style.

Compressive Strength

In order to acquaint the Consolidated Freight Classification Committee with triple-wall boxes, so that they could decide whether or not the boxes could be included in Rule 41, commercially made triple-wall and double-wall boxes were compared. The double-wall

*Tests of triple-wall corrugated boxes, March 9, 1956 (Unpublished report prepared for the Consolidation Freight Classification hearing in New York City on March 15, 1956).

TABLE I

Weight And Thickness Of Component Paperboards And Board Used In Triple-Wall And Double-Wall Corrugated Fiberboard Boxes

Material And Position	Weight (lb./1,000 sq. ft.)	Thickness (in.)
Triple wall	417.5	0.4950
Outer liner	91.58	0.0228
C-flute medium	26.68	0.0100
Second liner	41.10	0.0121
A-flute medium	25.90	0.0103
Third liner	40.80	0.0121
B-flute medium	27.75	0.0106
Inside liner	90.40	0.0232
Total weight of components	344.21	
Double wall	393.5	0.3850
Outer liner	90.46	0.0285
C-flute medium	26.80	0.0110
Center liner	90.68	0.0290
A-flute medium	26.60	0.0111
Inside liner	90.84	0.0273
Total weight of components	325.38	

TABLE II

Drop Test Results Of Regular Slotted Triple-Wall And Double-Wall Corrugated Fibreboard Boxes

Weight Of Load (lb.)	Height Of Drop (in.)	Average Number Of Drops To Failure*
Triple-Wall Corrugated Boxes		
160	15	29.5
350	15	12.7
350	21	9.0
350	24	4.3
Double-Wall Corrugated Boxes		
160	15	3.5
350	15	1.7
160	21	5.7
160	24	2.3

*Failure was considered complete when a scoreline cut developed the full length or the manufacturer's joint opened the full length.

boxes met the requirements of Rule 41 and had a manufacturer's stamp of 600-lb. test. They consisted of A- and C-flutes made from 26-lb. semichemical corrugating medium, all three liners of the structure being Fourdrinier kraft and each weighing 90 lb./1,000 sq. ft.

The triple-wall consisted of C-, A-, and B-flute construction with 42-lb. Fourdrinier kraft liners on the inside and 90-lb. Fourdrinier kraft liners on the outside. All three corrugating mediums were 26 lb. semichemical paperboard. The weight and thickness of the components are included in Table I.

The total weight of the components of the double-wall was 325.38 lb./1,000 sq. ft., as compared to 344.21 lb. for the triple-wall. The boxes, which were of the regular slotted type, were 52 in. long, 34 in. wide, and 34 in. high.

The triple-wall boxes were found to be extremely resistant to compressive forces in the top-to-bottom direction. One of the boxes tested withstood a maximum load of 8,500 lb., and the average was found to be almost 8,000 lb., or 7,922 lb., in an atmosphere that was maintained at 73°F. and 50 per cent R.H. Although the triple-wall material was only 1.06 times as heavy as the double-wall used in this test, the triple-wall boxes were 1.5 times as strong in compression as the double-wall boxes. The average maximum load for the double-wall boxes was 5,290 lb.

Rough-Handling Resistance

In rough-handling resistance, the difference between triple-wall and double-wall boxes was even more pronounced.

For the cornerwise-drop test a rather difficult load was used. The loads for each box consisted of 12 separate racks. The sides of the racks made of relatively thin plywood were observed to bend and bow outwardly when the box struck the floor. This action applied stresses to the top and bottom panels of the box and a simultaneous shearing action to the end panel.

After the bowing took place, there was a delayed snap action when the racks resumed their original shape. This resulted in a kickback to the end panel opposite the end on which the box was dropped.

In many instances this action caused scoreline cuts to develop on both ends of the box simultaneously, and in turn reduced the number of falls a box could withstand. The only difference between the loads for the double-wall boxes and those for the triple-wall was the weight. The loads for the double-wall boxes were 160 lb., while the triple-wall box loads were 350 lb., or 2.2 times as great.

After the boxes had been conditioned in an atmosphere of 73°F. and 50 per cent R. H., the cornerwise drops were made on a solid steel plate from heights of 15, 21, and 24 in., each box being dropped on each of its eight corners from each height, or until failure resulted.

For a specific height of drop, it was found that the triple-wall boxes with 350-lb. loads were from about two to seven times as resistant to failure as the double-wall boxes with a 160-lb. load. For example, the triple-wall boxes with 350-lb. loads averaged 12.7 drops from the 15-in. height, while the average number of drops for the double-wall boxes with 160 lb. from the

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same height was 3.5. From 24 in., the triple-wall boxes withstood about twice the number of drops the double-wall boxes did.

As a further comparison, the loads were switched; double-wall boxes were tried with 350-lb. and triple-wall boxes with 160-lb. loads. From 15 in., the triple-wall boxes averaged 29.5 drops, one attaining 33 drops to failure. Double-wall boxes with 350 lb. averaged 1.7 drops.

Results of the drop tests are given in Table II. *(End)*

Fillers on rails

(Continued from Page 56)

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Multiwall bag tests

(Continued from Page 77)

fice), Bureau of the Census, U.S. Dept. of Commerce.

(7) Walker, H. M. and Lev, J., *Statistical Inference* (New York: Henry Holt & Co., 1953).

Additional references:

Corte, Heins, "Mechanical properties of paper bags," *Verpakungs Rundschau* No. 8: Suppl. 49-55 (August 1955).

Houston, P. L., "Testing lime and cement bag paper," *Pulp and Paper Magazine of Canada*, **18** (Sept. 9, 1920), p. 947.

Lange, Wilhem, "Demands on the nature and properties of paper for bags," *Wochbl. Papierfabr.*, **69**, No. 45, p. 933.

Low Temperature Test Methods and Standards for Containers (National Academy of Sciences).

O'Conner, D. J., "Filled multiwalls in transit – high speed photo study," *Industrial Packaging*, **1** (1955), No. 7 (July), p. 23.

Younger, J. O. and Sargeant, J. A., "Evaluating multiwall bags," *Modern Packaging*, **28** (1954), No. 3 (Nov.), p. 157. *(End)*

Book review

(Continued from Page 114)

partment of Agriculture. Several foreign reports are included.

The reports available from the colleges are indexed alphabetically by all 50 states and by subjects from "apples" to "vegetables–general." In addition to kinds of produce, the subject index includes such items as "materials for packaging," "pre-packaging – general," "techniques for packaging," "cooling and refrigeration," among others–all related to produce packaging. Reports available from USDA are indexed by similar subjects.

A cross-section of some of the work covered by the numerous reports includes such subjects as building and equipment costs for fruit packaging, cartons and other containers for fruits, paper and cotton bags for potatoes, uses of polyethylene and other plastic materials as bags for fresh produce, along with many other subjects of interest to most persons connected in any way to the packaging of produce.

According to the authors, supplements are contemplated. A single copy of the directory is available free of charge, and may be obtained by writing either to: Food Distribution Section, Agricultural Extension Service, University of Delaware, Newark, Delaware; or to Produce Packaging Association, 202 South College Avenue, Newark, Delaware.–H.E.V., Jr.

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This is another way of asking just how good a job can he do of selling package quality to the people on the firing line? Even the most mechanized of plants rely on human eyes to scrutinize packages. Less mechanized lines have a lot of people assembling various parts of packages or components.

A more basic question is that of motivating those who see and handle packages to do a better job of screening and inspecting. Except for the fact that it involves packaging, the problem is similar to that facing most directors and supervisors of people who work. It is no secret that trying to motivate them and focus their interest is often a bewildering and frustrating experience.

How you can win their interest

Three approaches may help: (1) Appeal to them as buyers or consumers of the product, (2) give them physical aids to a better inspection job (mirrors or gauges, for instance) and (3) put extra inspectors on the line.

Lest anyone think the first suggestion is altruistic, take the case of a well-known producer of national distributed food items. At least one of its plants has workers belonging to a highly militant union whose leadership tends on the pink side — if not out and out red. We understand these workers on the packaging lines would not examine packages they were handling unless they received the five cents an hour extra normally accorded to inspectors. In other words, they would do a good job for the extra nickel but without it they would function as automatons, blindly transferring defective packages to outgoing lines.

But an inspired superintendent got through to them by appealing in simplest possible terms to their interest as consumers. With sufficient lucidity, he convinced them they would not want to buy defective or damaged packages of these products. Result: better screening of defective packages, fewer bad ones leaving the plant.

Our second suggestion appeals to the natural inclination of most people to do as little as possible. If you want them to check package quality, you have to make it easy for them to do so. Some plants do it with an abundance of mirrors. Others have various kinds of go — no go gauges or other devices — such as to spot-check positioning of jar labels. Result is that people can do what you want them to with little added effort on their part.

In some situations, the only answer is to provide supplemental inspectors. Many plants feel that doing so is well worth the added cost. One food products manufacturer flatly asserts manual rather than automatic case loading is well worth it in order to have a specific inspection of every package. As do many other managers, he concedes that packaging line speed is a major problem today, but he qualifies his observation by insisting that high speed must have with it assurances of no shortcomings in package quality. He thinks the answer lies in developing special equipment and in having intense training of workers — to indoctrinate them in maintenance of outgoing package quality.

Can you do this selling job?

All indications point to there being just one way to get this quality: Convince your people of its importance and sell them on maintaining it. Then and only then can you bring into play the devices and techniques calculated to help them do a better job of it.

Bruce Hollingren

Editor

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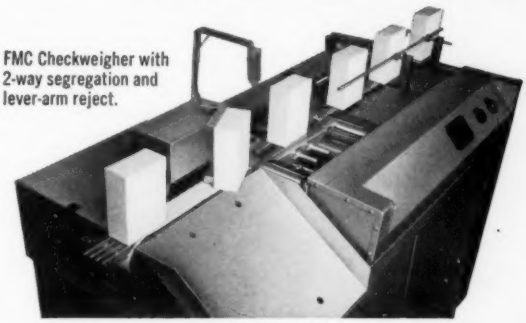

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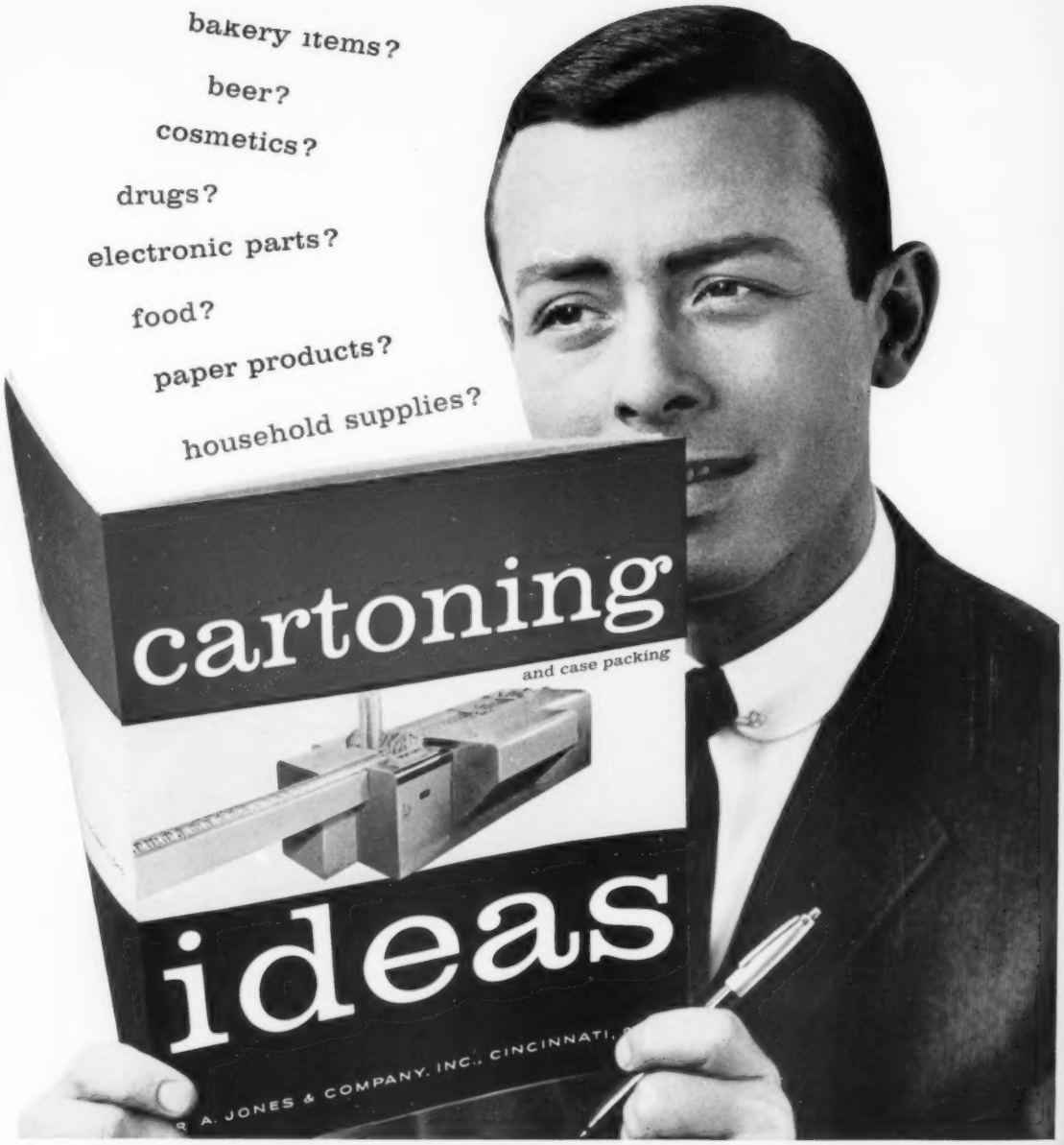

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